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THE UNIVERSITY OF ALBERTA

AN EVALUATIVE STUDY OF INDUSTRIAL ARTS GRAPHICS

by

© J. R. C. WRIGHT

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

DEPARTMENT OF INDUSTRIAL AND VOCATIONAL EDUCATION

EDMONTON, ALBERTA

FALL, 1970

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "An Evaluative Study of Industrial Arts Graphics" submitted by J. E. C. Wright in partial fulfilment of the requirements for the degree of Master of Education.

ABSTRACT

An attempt was made to identify the strengths and weaknesses of the Alberta Junior High School Industrial Arts Graphics curriculum. A model for the evaluation of school curricula developed by Robert Stake was selected and utilized in an investigation of the Graphics curriculum as interpreted and taught by one Industrial Arts teacher.

Descriptive data concerning the activities of the teacher and students in the Graphics program were obtained through interview and anecdotal recording techniques and indicated the extent to which the classroom experiences actually implemented the achievement of the desired outcomes. Standards of excellence were established by a committee and were used along with descriptive data by a committee of judges as a basis for discussion concerning the reasons underlying the lack of achievement and effectiveness of the instructional program. Through examination of the congruency and contingency existing among the available data the judges were able to make statements concerning the weaknesses and strengths of the Graphics program.

It was concluded that the observed apparent low achievement of the students occurred as a result of teacher misinterpretation of the curriculum as planned, selection of unsuitable and unrealistic activities and concepts, and inaccuracy in the measurement of concept understanding. This suggests that curriculum planners need to adopt methods to prevent misinterpretation of the curriculum guides, to select activities which are realistic and which do in fact lead to the desired concept understanding, and to specify effective teaching and measurement procedures for Graphics programs.

ACKNOWLEDGEMENTS

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CHAPTER I

Problem

Writers such as Tyler, Scriven, Stake, and Stufflebeam have emphasized the importance of evaluation in the planning and development of curricula. Tyler in his text, "Basic Principles of Curriculum and Instruction," makes a representative statement concerning the condition of evaluation:

> It should be clear that evaluation becomes a process for finding out how far the learning experiences as developed and organized are actually producing the desired results and the process of evaluation will involve identifying the strengths and weaknesses of the plans. This helps to check the validity of the basic hypotheses upon which the instructional program has been organized and developed, and it also checks the effectiveness of the particular instruments, that is, the teachers and other conditions that are being used to carry forward the instructional program. As a result of evaluation it is possible to note in what respects the curriculum is effective and in what respects it needs improvement (Tyler, 1959, page 69).

Scriven comments that, "evaluation proper must include as an equal partner with the measuring of performance against goals, procedures for the evaluation of the goals (Scriven, 1967, page 52)." He emphasized further that evaluation must not only judge the attainment of goals, but must judge the suitability of the stated goals for the particular situation. Three problems concerning evaluation were viewed by Stufflebeam as clear and inconvertible:

> (1) Effective evaluation is crucial to the future of education, for it will provide the critical links for improving operating programs and moving theory into practice.

(2) Education lacks the experience, trained personnel, and designs and instrumentation to accomplish the needed evaluation.
(3) Much research, development and training are needed to advance the science of educational evaluation (Stufflebeam, 1966, page 133).

In an effort to come to terms with the problems Stufflebeam defines, various theoretical models have been developed in recent years for the purpose of aiding curriculum developers in evaluation. Due to the previous lack of empirical evaluation techniques, the many people involved in curriculum development have not consistently used any one model for evaluation.

Because Stake's model was intended to set up data for comparative analysis, an evaluative study using the model may be of assistance to the Industrial Arts curriculum developers of the province of Alberta. Though the Industrial Arts curriculum in the province of Alberta has undergone extensive change, a curriculum evaluation using the techniques developed by Stake and such writers as Scriven, Hastings, Stufflebeam, and Doll has not been conducted. An evaluative study using Stake's model of the relationships among antecedents, transactions, and outcomes will give the curriculum developers some understanding of the success of the present curriculum and direction of new development.

Statement of the problem.

The purpose of this investigation was to evaluate that portion of the curriculum concerning "Graphics" in the Alberta Junior High School Industrial Arts program using a model patterned after that developed by Robert Stake. Because the unit of study under investigation had passed through the developmental stages, the nature of the evaluation was summative, that is, evaluation took place after the program was

fully developed and attempted to show the merits as well as the shortcomings of the program. Stake's (1967) assertion that the evaluator must limit the selection of variables has been followed.

Specific questions which this study sought to answer.

1. Do the students achieve the desired outcomes as listed by the teacher and the standards committee?
2. If the students do not achieve the outcomes (question 1), is it possible to identify the inconsistency of objectives, activities, outcomes which lead to this lack of achievement?
3. To what extent did the students learn the various concepts which were set down in the curriculum guide for Industrial Arts programs in the province of Alberta, as content for the field of "Graphics?"
4. Did the teacher initiate the student experiences and activities outlined in the curriculum guide?

Significance of the study.

The successful application of the technique presented in Stake's model to the Alberta Industrial Arts curriculum unit may provide data to fulfill Hastings' concept of the purpose of evaluation which was the:

> (1) Collection of information to be used as feed-back to the innovators.
> (2) To provide information as input for decision-making by the schools about adoption of course content improvement packages (Hastings, 1965, page 1).

The investigator also endeavoured to provide details concerning the ways in which a teacher may interpret and use the curriculum guide in his classroom.

Definition of terms.

1. Evaluation. For the purpose of this study, evaluation was defined as a process for discovering the extent to which classroom learning experiences were actually producing the desired results. This evaluative process demanded the identification of the strengths and weaknesses of the planned curricula.
2. Curriculum unit. For the purpose of this study, the term "Curriculum Unit" was used to describe one field within the various fields of study which were set out in the Alberta Junior High School Industrial Arts Curriculum Guide.
3. Graphics. For the purpose of this study, the term "Graphics" was used to refer to a particular field of study which was outlined in the Alberta Junior High School Industrial Arts Curriculum guide. This field embraced the two spheres of "Visual Communication" and "Graphic Communication." *

Description of Alberta Industrial Arts.

The curriculum for Industrial Arts in Alberta was presented in a guide published by the Department of Education for the province of Alberta. The functions of the Industrial Arts program listed in this guide were:

> 1. To provide a setting in which the adolescent is understood and one in which he might experience success which contributes to a positive concept of self and others.
> 2. To continue the development in the basic skills and knowledge begun in the elementary school and to broaden the educational program to include more opportunities for students to think critically and to draw generalizations.

---

*These terms are defined in the Alberta Junior High School Curriculum Guide.

3. To provide a breadth of curricular offerings suited to the interests and needs of twelve- to fifteen-year-old youth and to permit, wherever feasible, student selection of educational experiences.
4. To provide for the mental, physical and aesthetic needs of students and to develop talents in these areas.
5. To provide opportunities within the curriculum and extra-curricularly for the development of acceptable social, moral, and spiritual values.
6. To help pupils discover special interests and abilities that will enable them to set realistic educational and vocational goals.
7. To prepare the student to live successfully in a changing world (Junior High School Curriculum Guide, 1969, page 2).

The function of the program may be further clarified by a statement of general objectives. These objectives were listed as:

1. To provide exploratory experience in various technologies prevalent in a productive society.
2. To provide a synthesizing environment for students to apply their academic knowledge in the solution of practical problems.
3. To provide a supplementary guidance function by introducing the students to the multiplicity and interrelationship of educational and occupational opportunities.
4. To provide an environment which stimulated the individuals to discover and develop their interests and talents.
5. To develop attitudes of personal and social responsibility (Junior High School Curriculum Guide, 1969, page 3).

The fields in which the curriculum developers intended to actualize these objectives were six, sub-divided into thirteen units, with a minimum of three units to be covered each year. The fields of study were:

	Units
a) Power	one
b) Materials	
1. Metals	one
2. Woods	one
3. Plastics	one
4. Earths	one

	Units
c) Electronics	
1. Electricity	one
2. Electronics-Computer	one
d) Graphics	
1. Visual Communications	one
2. Graphic Communications	one
e) Industrial Crafts (choose one only in junior high)	
1. Art Metal	one
2. Leather	one
3. Lapidary	one
f) Developmental Research	one

(Junior High School Curriculum Guide, 1969, page 5).

The curriculum guide suggested that Industrial Arts in Alberta should be taught through a multiple-activity program. In the guide, the curriculum designers have defined a multiple-activity laboratory as one in which three or more activities are in progress simultaneously. By using the multiple activity approach, the curriculum developers believed that a variety of exploratory experiences could be provided with a minimum of space and equipment requirements. It was recommended that the laboratory be organized into a number of different self-contained sections, each section representing a different field of study and large enough to accommodate a maximum of six students. The class was to be divided into three or more groups, with each group working through each course unit within the section to which it was assigned. After completing eight to twelve weeks in any one curriculum unit, each group was to rotate to provide the opportunity for each student to undergo new experiences.

Investigative methods.

For an analysis of the unit on "Graphics" various techniques were utilized to complete the twelve sections of the evaluation matrix developed by Robert Stake (Figure 1, page 16). The "intents" column

of the matrix was completed by recording the statements of intent made by the teacher involved in the study. The "observations" column of the matrix consists of a summary record of class video-tapings, anecdotal recordings, and student interviews. The "standards" column consisted of a record of the course expectations expressed by those persons constituting the standards committee. A summary of the judgments, which were made by the members of the judgment committee, was recorded in the fourth column of the matrix. The analysis of this matrix should aid in the formation of conclusions concerning the curricula.

Limitations. Evaluations or measurements based on observation are often subjective because it is most susceptible to faulty perception and bias. The limiting factors of observation as a procedure tend to be over-weighed by the advantage that during observation all types of sensory data can be handled simultaneously and in proper relationship. Moreover, the full pattern of a phenomenon can be seen as well as its individual components. Thus, observation can be a highly desired procedure, valued for its comprehensiveness. To minimize the errors inherent in observation, anecdotal records were made using direct observation and video recordings of the group's activities. Further attempts were made to eliminate bias by having the observations made and recorded before any comparison to standards or judgments was made.

Although the students involved in this study were accustomed to the presence of video-tape equipment, the possibility that behavior was altered through "halo effect" must not be disregarded.

Delimitations. The research procedure which was followed necessitates the classification of this investigation as a "Descriptive Case Study"

consisting essentially of research in depth rather than in breadth. The intensive process-orientation of this study whose method of direct observation necessarily confined it to a small number of participants attempted to uncover those factors which related to the achivement or non-achievement of desired outcomes.

Population and sample. One school was selected in which to conduct the observations because it had available all the equipment required by the curriculum developers for the study of graphics as well as video-tape recording equipment necessary for the research. No other schools possessed both types of equipment and were therefore eliminated as possible research situations. Scheduling of classes necessietated that observation of only a single rotation of a grade 8 "Visual Communications" class one one rotation of a grade 9 "Graphics Communications" class could be conducted. The two groups totalling eleven students were selected randomly for observation and consisted of five grade 8 Visual Communications students and six grade 9 Graphic Communications students.

CHAPTER II

Review of Literature

A review of relevant literature revealed several distinct theories concerning curriculum evaluation though all placed emphasis upon the importance of curricular evaluation as a part of educational planning. A relationship appeared to exist among the evaluative models developed by the various writers reviewed and as one would expect, the difference among the models were primarily those of emphasis, terminology, and data recording procedures. Of the many writers in the field of curriculum evaluation, the writings of Scriven, Hastings, Stufflebeam, Doll, and Stake were selected for elaboration in this review because of their emphasis upon techniques of evaluation. A general review of Scriven, Hastings, Stufflebeam, and Doll was made in order to examine individual techniques and theories concerning evaluation. The writing of Robert Stake was selected for a more thorough review, because his model encompassed many of the techniques which the other four writers had designated as necessary for an adequate evaluation of curricula and further provided a method for a full comparative analysis of the data.

Scriven's theory of curricular evaluation.

In the "Methodology of Evaluation," Scriven (1967) maintains that there are two basically different approaches to evaluation which might well be combined to form a third "compromise" approach to the evaluation problem.

The first evaluation method which Scriven called "Intrinsic evaluation," involved the appraisal of the teaching instrument itself with regard to

content, goals, grading procedures, and teacher attitudes.

A second method designated "Pay-off evaluation" comprised an examination of the teaching instrument upon the pupil and consisted of a comparison between the pre-test and post-test results of both experimental and control groups.

Scriven stated that, to those subscribing to the "pay-off" method of evaluation, the sole factor of importance was the change in student verbal expression, which was effected between the commencement and the termination of the course of study. The important consideration was the students' ability to answer correctly. Scriven did not support "Pay-off evaluation," because he believed that the nature of student mistakes was also of importance and evaluation of students' test results should be used to determine shortcomings in comprehension, shortages of essential facts, and lack of practice in basic skills. In Scriven's words:

> If we have really satisfied ourselves that we are using good tests of the main criterion variable, then to discover parity of performance is to have discovered something extremely informative. "No difference" is not "no knowledge" (Scriven, 1967, page 67).

Instead of the more rigorous evaluation methods dealt with above, Scriven recommends a mediated approach combining the evaluation of the teaching instrument as well as outome criteria. This third type of evaluation centered around goal formation though goals were not absolute commitments but regularly re-examined and modified during the early stages of curriculum development. As curriculum development continues, a test question pool constructed with concentration upon operational interpretations of the goals was to be built up. The evaluator must then secure external judgments as to the cohesiveness of alleged goals,

the actual content, and the test questions. Scriven hypothesises that the outcomes of such a method would provide the curriculum developers with an accurate picture of the degree to which the program was successful.

Evaluation model of Hastings.

Hastings believed that evaluation was not equivalent to giving, scoring, and interpreting tests in normative terms, but was rather, the search for differences among methods of instruction. He objected to the excessive emphasis placed upon ascertaining the extent to which a given program met objectives in terms of student test performance.

Hastings thought that the focal point of evaluation should be instructional research rather than test results as a measure of the attainment of behaviorally defined objectives. The results of comparable reliable tests function to provide the educator with data to evaluate his own teaching methods. Having determined which concepts the students have acquired and which they have not, the evaluator must pose the question, "why does the difference exist?" Any investigation which reveals why a student learns more effectively through the performance of one activity as opposed to another was of prime importance to evaluation.

Hastings' model for evaluation which consisted of an outline for the comparison of different instructional methods, was summarized as follows:

(1) Instructional method comparison
  - requires definable objectives (behavioral objectives).
  - requires reliable tests of the behavioral objectives, the results of which are suitable for comparison.

(2) Results of evaluation are

- the determination of the level of concept formation.
- the determination of the reasons behind group differences.
- the isolation of the most effective methods of instruction.

Evaluation model of Stufflebeam.

Stufflebeam (1966) theorized that evaluation was done in two different stages which he called "product evaluation and process evaluation." Product evaluation was a method used to relate outcomes to goals on the basis of specified criteria and was to be a yearly process, which would not normally provide the necessary information for effective decisions to be made at the local level. Process evaluation related procedures to outcomes, and in so doing, provided data useful for local control and decision-making. Such evaluation would require identification and monitoring of the potential sources of project failure on a continuous basis and in a discreet manner.

Stufflebeam developed a model for all types of evaluation as follows:

A. Focusing the Evaluation
   1. Identify the major level(s) of decision-making to be served, e.g., local, state, or national.
   2. For each level of decision-making, project the decision situations to be served and describe each one in terms of its locus, focus, criticality, timing, and composition of alternatives.
   3. Define criteria for each decision situation by specifying variables for measurement and standards for use in the judgment of alternatives.
   4. Define policies within which the evaluation must operate.

B. Collection of Information
   1. Specify the source of the information to be collected.
   2. Specify the instruments and methods for collecting the needed information.

3. Specify the sampling procedure to be employed.
4. Specify the conditions and schedule for information collection.

C. Organization of Information
   1. Provide a format for the information which is to be collected.
   2. Designate a means for coding, organizing, storing, and retrieving information.

D. Analysis of Information
   1. Select the analytical procedures to be employed.
   2. Designate a means for performing the analysis.

E. Reporting of Information
   1. Define the audiences for the evaluation reports.
   2. Specify means for providing information to the audiences.
   3. Specify the format for evaluation reports and/or reporting sessions.
   4. Schedule the reporting of information.

F. Administration of Evaluation
   1. Summarize the evaluation schedule.
   2. Define staff and resource requirements and plans for meeting these requirements.
   3. Specify means for meeting policy requirements for conduct of the evaluation.
   4. Evaluate the potential of the evaluation design for providing information which is valid, reliable, credible, timely, and pervasive.
   5. Specify and schedule means for periodic updating of the evaluation design.
   6. Provide a budget for the total evaluation program (Stufflebeam, 1968, page 1).

Evaluation model of Doll.

Doll (1965) in his text, "Curriculum Improvement," asserted that "to make evaluation appropriately comprehensive, one must view the effects of educational experience broadly, taking into account the wholeness and complexity of the learner(Doll, 1965, page 312)." To be effective, evaluation must rely upon a variety of instruments which are used according to carefully prescribed purposes. Doll suggested the use of

a seven-point sequential model for the evaluation of curriculum programs:

1. The evaluator must decide which percentage of the program is to be evaluated.
2. The evaluator must make a clear statement of goals for the program.
3. The operational criteria for determining attainment of goals must be listed by the evaluator.
4. The criteria of progress must be listed.
5. The evaluator must list all process and instruments capable of satisying the criteria in steps 3 and 4.
6. The best processes and instruments must be selected and applied to gather evidence needed by the evaluator.
7. The evaluator must generalize from the data he has collected and draw tentative conclusions.

Evaluation model of Stake.

According to Stake (1967), both description and judgment are essential aspects of evaluation of any educational program. Generally, Stake believed that the main objective of evaluation was the revelation of those relationships which aided in the formation of generalizations concerning educational practices.

In building a model of evaluation, Stake identified three main bodies of information from which data must be drawn. "Antecedent data" was to include all data which were drawn from the body of knowledge possessed by the student prior to instruction. "Transaction data" was to be comprised of a cataloging of all encounters experienced by a student during the process of education. The third body of information

was referred to as "outcome data" and was to include information concerning abilities, achievements, attitudes, and aspirations which the student acquired as a result of his educational experience.

Stake asserted that data obtained during the evaluative process would fit into either a descriptive matrix or a judgmental matrix. The matrices allowed the recorder to group the data into four classes which were identified as (1) "intents," (2) "observations," (3) "standards," and (4) "judgments." Figure 1 page 16, is a graphic representation of Stake's matrix for the collection of evaluative data.

(1) Stake used the term "intents" to signify "goals" or "objectives" including environmental conditions, the subject matter coverage, the demonstrations, and student behavior as planned by the instructor. In Stake's opinion, intents must not be limited by an emphasis on behavioral outcomes since teaching, as well as what learning is anticipated, must be examined.

(2) To collect the observation data, evaluators used methods of direct and personal observation of situations as well as the interview, check lists, opinionaires, and various psychometric tests. Stake was of the opinion that the evaluator could choose to ignore only those observations which he felt did not contribute effectively to the understanding of the educational activity.

(3) The measurement of excellence would require explicit rather than implicit standards. Stake believed that the ability to describe a student's command over his intellectual environment was an important aspect of the evaluation process.

(4) From judgments we may obtain an over-all or a composite rating of merit which could be used in future educational decision-making

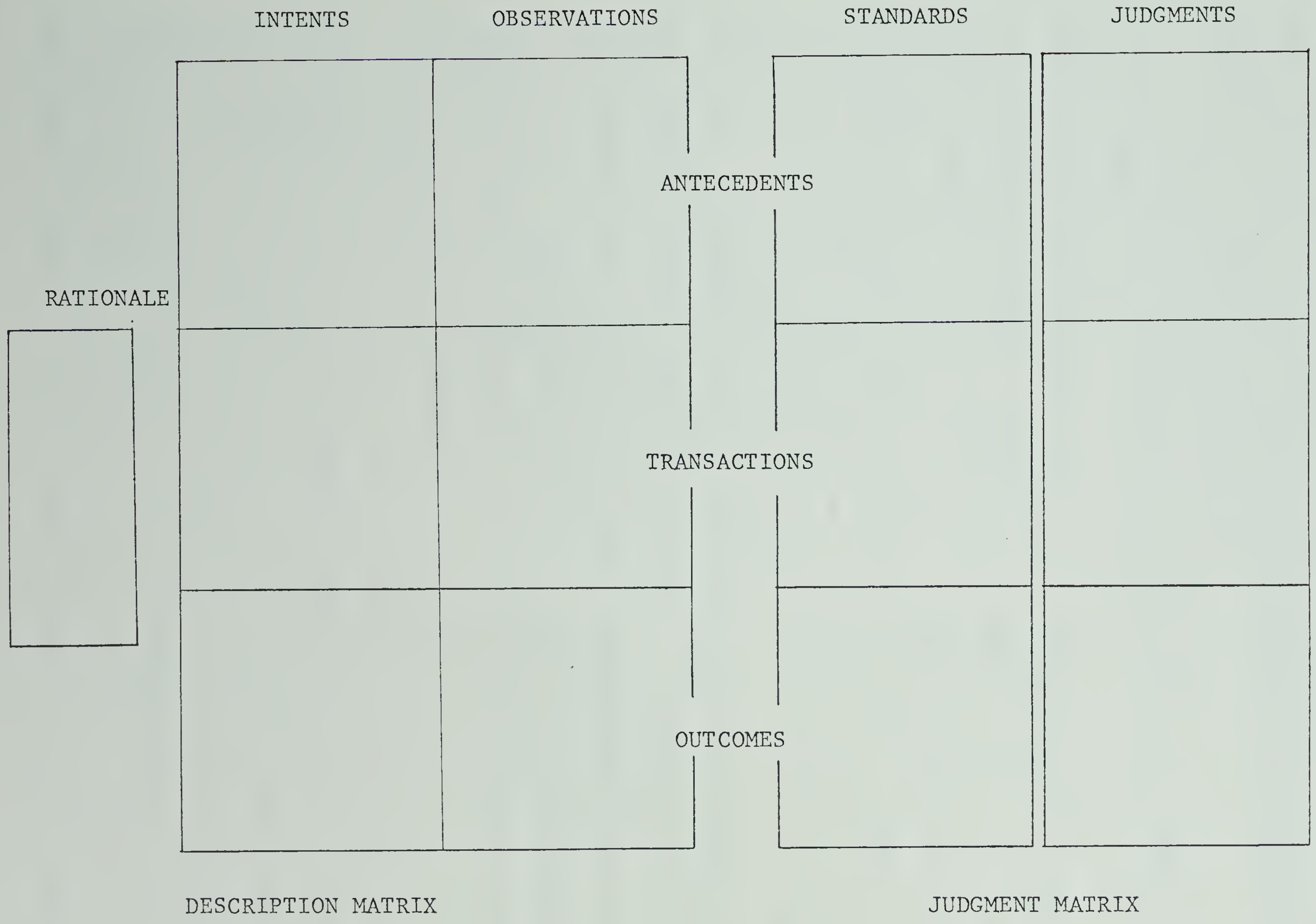

Figure 1. A layout of statements and data to be collected by the evaluator of an educational program (Stake, 1967, page 529).

because it represents the comparison of existing programs. Stake discussed two levels of judgment: relative judgments which were comparisons of characteristics of alternative programs, and absolute judgments, derived from personal conviction. In summary, Stake expressed his opinion that the intended uses of the information by educators should determine which kind of judgments would be made.

To analyze descriptive evaluation data, which is an essential part of the judgment process, Stake suggested the use of two principal methods. First the contingency among antecedents, transactions, and outcomes can be examined and secondly, the congruence between Intents and Observations can be observed. In his chart (Figure 2, page 19), Stake illustrated the format which may be used in processing the data. In order for the data to be congruent, that which was intended must actually have happened. Congruency did not indicate that the outcomes were reliable or valid, but rather showed only that that which was intended did actually occur. The contingency method required the evaluator to identify outcomes which were dependent upon particular antecedent conditions and instructional transactions. Stake declared that a knowledge of the relationships among antecedents, transactions, and outcomes would permit the educator to make improvements to programs.

When judging a program, two bases were mentioned by Stake, judgment with respect to an absolute standard, a theoretical criterion of excellence, and judgment with respect to a relative standard, the comparison of the results of two sets of descriptive data. The process of judgment was one of determining whether or not each standard was met, and then of applying a weight of importance to that standard. Stake symbolized the judgment process in Figure 3, page 20, where the relationship between

either descriptive data and standards of excellence, or between one collection of descriptive data and another was shown.

Summary.

In general the differences among the models appeared to be those of emphasis, terminology, and data recording procedures. Because the evaluation model which was developed by Stake subsumes the models developed by the other four writers reviewed, it has been chosen as the basis for the study.

The model of evaluation developed by Stake is similar to the mediated evaluation method advocated by Scriven with only this difference, that Stake's model presents techniques of accurate data analysis impossible in Scriven's formulation. Thus an evaluation in terms of Stake's model would include both an operational interpretation of goals and a determination of shortcomings in comprehension.

Stake also agrees substantially with Hastings, and Stake's model supplied the type of focus upon the instructional process which Hastings demanded, as well as providing the kind of comparative study of data at the center of Hastings' formulation. Stake's revision of Hastings, like his revision of Scriven, is in the direction of accurate visualization of the education process so that areas of difficulty might be precisely pin-pointed.

Because of their emphasis upon the total educational process at the expense of accurate and limited empirical investigation, Stufflebeam and Doll are necessarily on the periphery of this study. Nowhere is Stake in disagreement with them, but he does revise their models so as to make them more detailed and workable.

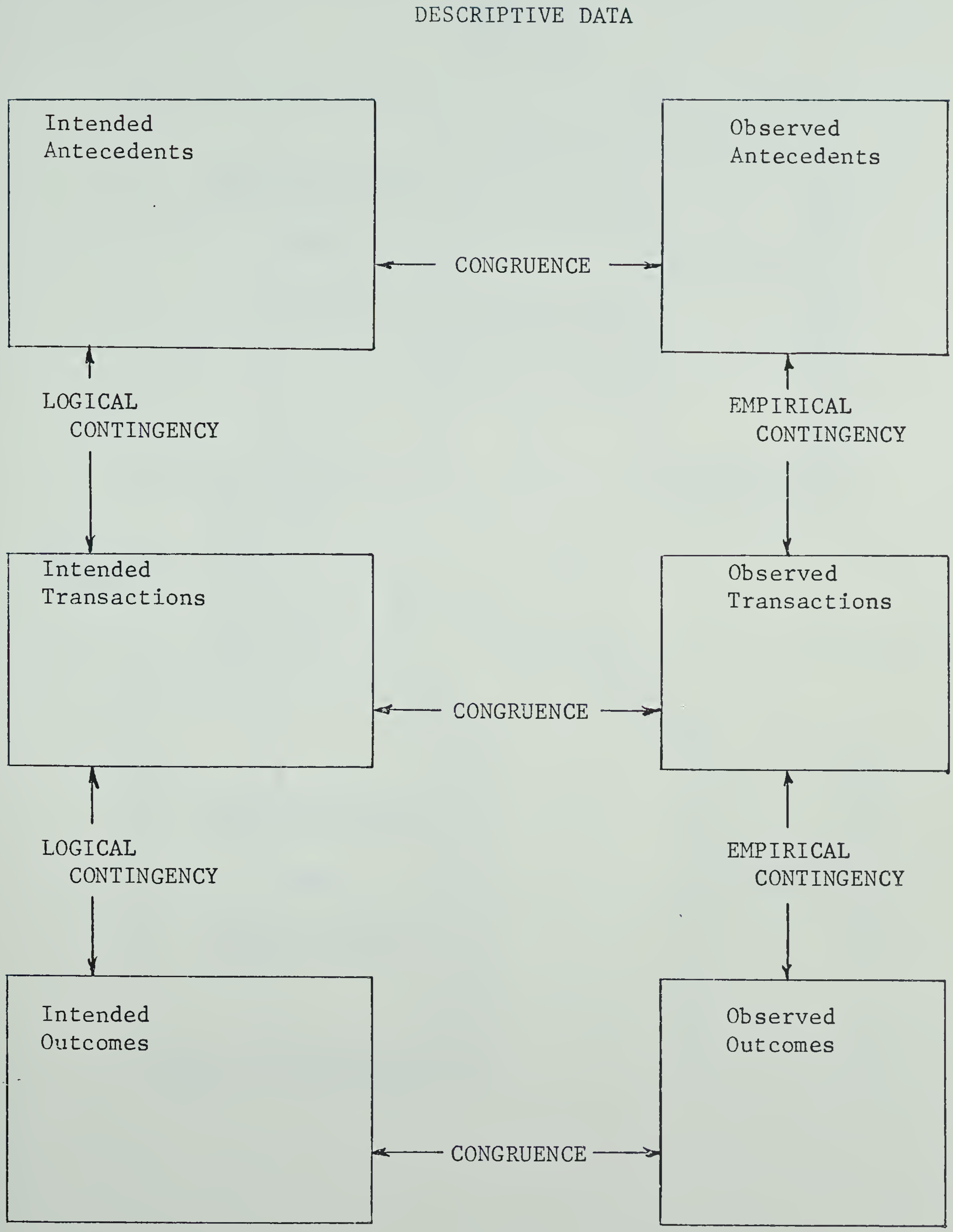

Figure 2. A representation of the processing of descriptive data (Stake, 1967, page 532).

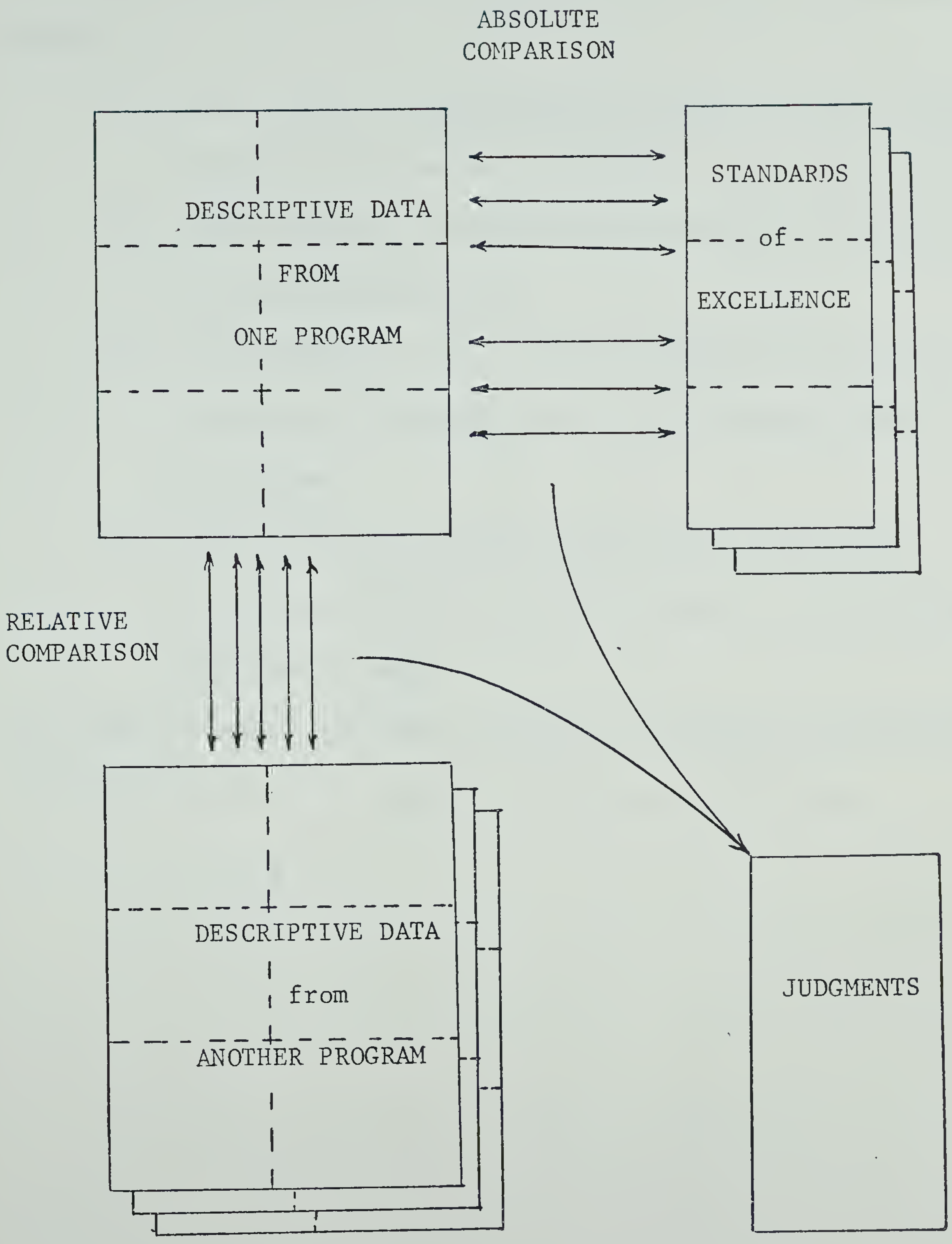

Figure 3. A representation of the process of judging the merit of an educational program (Stake, 1967, page 537).

All the models examined have the following characteristics in common:

(1) Each attempts to determine the extent to which learning experiences are actually providing the desired results.

(2) Each attempts to identify the strengths and weaknesses of the curriculum plan.

(3) Each attempts to check into the effectiveness of the instructional program and of the instruments used in the program.

(4) Each attempts to identify the areas in which the curriculum is effective and the areas of the curriculum which need change.

Only Stake's model provides a method of collecting and examining the empirical data so that accurate evaluation can be made.

CHAPTER III

Investigative Method

This study of the field of Graphics as outlined in the Alberta Junior High School Industrial Arts curriculum guide used the evaluative model developed by Robert Stake in an attempt to evaluate accurately one portion of the Industrial Arts curriculum as it is presented to a population of eleven students in a classroom situation. For each of the two units comprising the field of study entitled Graphics, data were collected by direct observation and recorded in two matrices, in accordance with Stake's suggestion (see Figure 1, page 16). A description of procedures employed in data collection, classification, and recording is provided below.

The evaluative matrix.

The intents column. For each of the two units of Graphics, the intents column of Stake's matrix (Figure 1, page 16) was filled in using data supplied by the teacher involved. The teacher interpreted his expectations regarding antecedents, transactions, and outcomes in terms of the intentions of the curriculum planners as recorded in the curriculum guide. The level of student performance for each of the intended transactional activities was specified by the teacher and was recorded by the investigator in the intents column of each matrix (see Appendix VIII). The teacher used the following outline to describe the levels of performance which he expected of each of his pupils.

Level	Performance
I	Imitating, duplicating, repeating. This is the level of initial contact. Student can repeat or duplicate what has just been said, done, or read. Indicates that student is at least conscious or aware of contact with a particular concept or process.
II	Level I, plus recognizing, identifying, remembering, recalling, classifying. To perform on this level the student must be able to recognize or identify the concept or process when encountered later, or to remember or recall the essential features of the concept or process.
III	Levels I and II, plus comparing, relating, discriminating, reformulating, illustrating. Here the student can compare and relate this concept or process with other concepts or processes and make discriminations. He can formulate in his own words a definition, and he can illustrate or give examples.
IV	Levels I, II, and III, plus explaining, justifying, predicting, estimating, interpreting, making critical judgments, drawing inferences. On the basis of his understanding of a concept or process, he can make explanations, give reasons, make predictions, interpret, estimate, or make critical judgments. This performance represents a high level of understanding.
V	Levels I, II, III, and IV, plus creating, discovering, reorganizing, formulating new hypotheses, new questions and problems. This is the level of original and productive thinking. The student's understanding has developed to such a point that he can make discoveries that are new to him and can restructure and reorganize his knowledge on the basis of his new discoveries and new insights (Bradfield and Moredock, 1967, page 204).

The observation column. By various techniques the investigator obtained his observation data which were classified and recorded within the respective cells designated antecedents, transactions, and outcomes of the observation column of Stake's model (see Figure 1, page 16). The observations columns of the two matrices were made and recorded for two groups of students, the first group consisting of five grade 8 students doing a unit of Visual Communications, and the second, a group of six grade 9 doing a unit of Graphic Communications. For each of the

two units of Graphics the completed observations appear in their respective matrix (see Appendix VIII).

The investigator obtained his antecedent observations from:

(1) the individual student's cumulative record of school achievement.

(2) the individual student's results on a pre-test.

(3) the direct questioning of individual students.

and the resultant information was recorded in the observed antecedents cells of the two matrices.

Observations of student transactions were made and recorded through the use of anecdotal recordings on video tape of students' classroom behavior and through direct observation and were recorded in the observed transaction cell of the two matrices. Observed student outcomes were reflected by:

(1) the level of performance of each student during his classroom activities.

(2) the responses made by each student during an interview with the investigator.

(3) the results obtained by each student on a post-test. The investigator recorded the results in the cells of the two matrices labelled "observed outcomes."

Standards column. The standards column of Stake's matrix (see Figure 1, page 16) was completed for each of the two units of Graphics by a standards committee whose selection and function are outlined below. The completed standards columns appear in the two matrices of Appendix VIII.

In selecting those who were to serve on the standards committee the investigator considered the following factors:

(1) Familiarity with the objectives of the Industrial Arts program.

(2) Knowledge in the field of Graphics.

(3) Understanding of the abilities of the student age group involved in the proposed study.

(4) Willingness to devote time to the establishment of standards.

A representation of teachers and Industrial Arts supervisors was selected for the standards committee whose members are listed below:

1. The Industrial Arts supervisor for the Edmonton Separate School board who has had extensive experience in the field of "graphics" and for several years had chaired the provincial Industrial Arts curriculum planning sub-committee for this field of study.
2. A junior high school teacher for the Edmonton Public School board who has taught junior high school Industrial Arts for six years and during the last year was a member of the provincial Industrial Arts curriculum planning committee.
3. A graduate student in the Department of Industrial and Vocational Education of the University of Alberta who has seven years experience as a junior high school Industrial Arts teacher. While teaching he served as a member of three curriculum planning committees for the province of Saskatchewan and he also served for one term as president of the Saskatchewan Industrial Education Association.

The twenty-one activities for which the committee set standards were obtained by the investigator from ten Industrial Arts instructors. Each instructor was asked to list the activities which he employed in teaching the content outlined in the curriculum guide for the field of Graphics and the resultant list was organized and condensed.

The standards committee used the September 1969 Industrial Arts curriculum guide as a reference and was requested to:

(1) indicate which objectives of Graphics were achieved through performance of each activity.

(2) indicate which concepts of Graphics were illustrated by each activity.

(3) indicate the basic procedures which constituted each activity.

(4) indicate which level of performance was indicative of student achievement of the desired learning.

(5) indicate the antecedent conditions for each activity.

The information obtained from the standards committee was classified and was recorded within the respective cells assigned to antecedents, transactions, and outcomes.

The judgments column. The judgment column of Stake's matrix (see Figure 1, page 16) was completed by a judgments committee whose selection and function are outlined below. The completed judgments columns appear in the two matrices of Appendix VIII.

The judges were selected by the investigator according to their degree of familiarity with the Industrial Arts program in Alberta and consisted of the following members:

1. The Supervisor of Industrial Arts for the province of Alberta who played an active part in the development of the provincial Industrial Arts program and who has had an opportunity to visit many Junior High School Industrial Arts laboratories, and is familiar with the program as it is taught in the Junior High Schools of the province.
2. The Supervisor of Industrial Arts for the Edmonton Public School Board, who has had many years experience on provincial Industrial Arts curriculum committees, and has had the opportunity to visit many different Junior High School Industrial Arts laboratories and therefore is familiar with the program as it is taught in the Junior High Schools of the city of Edmonton.
3. A professor from the Department of Industrial and Vocational Education at the University of Alberta who has had experience as an instructor in the field of Graphics at University level and has served on the provincial Junior High School curriculum planning committee. He was fully acquainted with the program as it is presently taught in the Junior High Schools.

The investigator supplied the judges with the program intents, observations, and standards, as they were recorded in the two matrices of Appendix VIII, and asked them to pass judgment concerning:

(1) cases of congruence or incongruence among the intents, observations, and standards.

(2) cases of contingency among the antecedents, transactions, and outcomes.

(3) the extent to which the objectives of the graphics program were achieved.

(4) the extent to which the concepts of Graphics, as outlined in the curriculum guide, were understood by the pupils.

(5) the value of the curriculum under examination, making reference to its strengths and weaknesses.

The judgments thus obtained were summarized and recorded in the judgments columns of the two matrices of Appendix VIII.

Physical description of the setting.

The school, located in a new subdivision in the south-west section of the city of Edmonton, endeavoured to have a student-centered permissive learning environment. Industrial Arts was taken as an option by most of the grade 8 and grade 9 boys. The program consisted of a multiple activity approach to IA with the grade 8 students offered Metals, Woods, Plastics, and Visual Communications and grade 9 students, Power Technology, Electronics and Computers, and Graphic Communications.

The equipment available for the use of the students in their study of Visual Communications and Graphic Communications consisted of:

spirit duplicator
sign press and type
rubber stamp machine and type
A.B. Dick photo copier
AM offset press
blue ray developer and exposer
drafting table with drafting arm and instruments
leroy lettering set
contact print maker
enlarger

roll film developing tanks

paper developing trays

plate film developing tanks

print drier

negative brush

paper safe

correct safe lights

35 mm camera and light meter (broken at time of study)

2¼ by 3¼ press camera

electronic flash unit

This school also had video tape recording and playback equipment available for the use of the teacher.

Data collection methods and procedures.

The collection of data during the proposed study required tape recorders, video tape recorders, personal observation, and written tests to collect data on the activities taking place during the curriculum application under study. Through daily observation, evaluation of students' work-products, teacher-pupil interviews, and written tests the investigator measured the degree of student understanding. Written tests were used at two different stages: the pre-test attempted to examine prior knowledge, and the post-test endeavoured to examine content retention and concept formation.

To test concept understandings before and after instruction, the investigator gathered different multiple choice questions which had been used by twelve instructors of Junior High School Graphics. Of the one hundred and fifty questions obtained, thirty-one were selected

by a committee consisting of one teacher, one Industrial Arts education graduate student, and one faculty member of the Department of Industrial and Vocational Education. Using the curriculum guide the committee sorted the questions with regard to the concepts they felt each question tested. The pre-test post-test appears in Appendix III.

Data analysis.

The data were organized into the appropriate cells of Stake's model and the relationships of congruence and contingency, discussed by Stake, were considered. Through consideration of the incongruence and lack of contingencies the strengths and weaknesses of various portions of the program could be identified.

CHAPTER IV

Presentation and Discussion of Data

This chapter is divided into two distinct sections. The first section is concerned with details of the summarization and presentation of the data in each cell of the two matrix charts in Appendix VIII. Since the process of setting up both charts was virtually identical, the following brief commentary on the presentation of data will apply to both charts. In the second section the two matrix charts are discussed and an attempt is made to identify data relevant to the answering of the four questions in Chapter 1 (page 3).

Presentation of data.

Of the two matrix charts of Appendix VII chart No. 1 presents the data collected in the grade 8 Visual Communications class and chart No. 2 presents the data collected in the grade 9 Graphic Communications class. Since the reader will be aided during his reading of the presentation of data by having the charts before him, the investigator recommends that the charts contained in the envelope labelled Appendix VIII be removed and opened out.

Intents column chart no. 1 and no. 2. The antecedents cell of the column summarizes the teacher's assumptions concerning the students' prior knowledge, experience, and abilities. The various activities which the teacher intended the students to complete during a study of each of the units of Graphics are recorded in the transaction cell of the students' respective matrix charts. The outcomes cell summarizes

the instructor's estimate of projected achievement through performance of the listed activities of each of the groups of students.

Observation column chart no. 1 and no. 2. The observations column of the charts no. 1 and no. 2 summarize the anecdotal recordings made over an eight week period of the Visual Communications and Graphic Communications classes respectively, and are a concise account of the detailed observations and interviews listed respectively in Appendices IV and V. Both antecedents cells of the columns are records from school files giving ages, mental ability, and the previous experience of the students observed as well as the results of the pre-test (see Appendix III). The transaction cell of the column is a summarized record of the students' work attempted or completed (see Appendices IV and V) along with a record of the time spent on these activities. The students' level of performance in the various activities as estimated by the investigator following classroom observation is given in the outcomes cell of each of the columns.

Standards column charts no. 1 and no. 2. The standards column of the charts is a summarized record (for which full details are given in Appendix VI) of the pertinent comments of the three man standards committee. The transaction cell of the column records the standards committee's expectations of the activity involved in an average unit of Visual Communications and Graphic Communications. The outcomes cell of the column summarizes the expected results of the activities in terms of objective achievement and concept understanding. The levels of student performance expected by the standards committee are recorded as standard outcomes.

Judgments column chart no. 1 and no. 2. The judgments column of charts no. 1 and no. 2 is a summary of the comments of the judgments committee (see Appendix VII) who, as noted in Chapter III, were requested to pass judgments upon the congruences or incongruences which existed among the intents, observations, and standards columns of each of the charts, and the contingency among antecedents, transactions, and outcomes of each. In the case of both matrices the judges made absolute comparisons using the data presented in the two descriptive columns and the standards set by the committee. The judgments were placed in the appropriate cells. Those occasional judgments concerning the entire field of Graphics were recorded on either chart no. 1 or chart no. 2 but not in all cases on both.

Discussion of data.

Achievement of the students. The judgments committee members stated that none of the five grade 8 students in Visual Communications achieved the objectives set out in the curriculum guide. Because the levels of performance expected by the teacher were lower than those expected by the standards committee the students achieved more of the intended outcomes set by the teacher than those of the standards committee. The break-down of the group performance runs as follows: four of the six intended project type outcomes were achieved by two of the five students observed. A's performance on four of six activities was equivalent to, or higher than that expected by the standards committee, whereas he achieved five out of six activities to a level acceptable to the teacher. C achieved four out of six activities in accordance with the teacher's expectations and only two out of six to the satisfaction

of the standards committee. Boys B and D both completed two out of six of the activities to a level acceptable to the teacher and while boy D performed at the same level in the view of the standards committee, boy B completed only one project to their satisfaction. Boy E completed three out of six and one out of six activities to the level desired by the teacher and standards committee respectively.

The judgments committee stated that the levels of performance of the students in Graphic Communications fell well below both the levels expected by the standards committee and those expected by the teacher. Of the six boys observed only A and B achieved one of the six activities to a level satisfactory to the standards committee. They and boys C, D, and E completed one activity each to the satisfaction of the teacher's expected level of performance. Boy F did nothing at all. The largest percentage of the students' time was spent in the performance of activities from the unit of Visual Communications.

The data discussed indicates that the students in Visual and Graphic Communications failed to achieve the outcomes set either by the standards committee or the teacher.

Factors contributing to lack of achievement. The failure of students to achieve the desired outcomes could be explained partially by the incongruences and lack of contingency within the program. In both Visual and Graphic Communications incongruence lead to lack of achievement. In rubber stamp making, for instance, there was a lack of agreement as to what level of performance should be required of students to indicate that the desired performance had occurred. Drafting was not attempted by the students, yet the standards and judgments committees unanimously

stressed its importance. The judges stated that the teacher's intentions in drafting were unrealistic, and that sketching as outlined in the standards column, would be more realistic. Generally the main incongruences in the Graphic Communications program existed between the intended and standard antecedents and the observed antecedents. Since the students seemed considerably less knowledgeable and skillful than had been expected, the unrealistic expectation of the teacher and of the standards committee resulted in student inability to complete the Graphic Communications transactions to a desirable level in the allotted time. There was an indication that the standards, as set by the standards committee, were not congruent with the intentions of the teacher and that the high expectations of the standards committee proved to be unrealistic in learning situations, where student freedom is encouraged, and where only limited time is available. The judges stated that, for the intents to be congruent with the standards, the teaching of students must be highly structured so that the achievement of the desired outcomes can be ensured.

Lack of contingency was evident between the intended transactions and intended outcomes. Contingency was also lacking between the Visual Communications and the Graphic Communications units, a fact which resulted in extreme incongruences in the latter. With reference to activities utilizing the darkroom, for example, the judgment committee stated that student performance would be improved if the teacher demonstrated all operations rather than encouraging self-study and trial-error learning. The judges stated that the intended outcomes were not, in fact, contingent with the intended activities. The judgment committee was of the opinion that more extensive learning of concepts and processes should have been

expected as an outcome and suggested the inclusion of more discussion group activities, which would perhaps bridge the gap between machine operation and the understanding of basic concepts and processes.

Extent of concept formation. Though the judges commented that the post-test results did not give an absolute accurate measure of the students' understanding, the results of the test indicate that little learning of concepts occurred. Some of the reasons the judges submitted for doubting the validity of the test scores were content rather than concept orientation of the tests and their difficulty. They attributed the low results to low levels of performance of the various activities, or to the gap between machine operation and concept formulation. Though the judges were unable to agree upon a realistic level of performance for the activities intended for this grade of student, there was agreement that at least a level III performance is required before the student would understand the concepts. This assumption seems to be supported by the intents, observation, and standards statements concerning the sign press and rubber stamp activities, in which a level I performance was not considered high enough to ensure concept understanding.

Further, the judges felt that a progressive class atmosphere, such as the one which existed in the classes observed, was not conducive to the learning of the concepts because the students were unable to spend the time necessary to complete the intended activities with a high enough level of performance to ensure an understanding. The judges emphasized that a classification of the concepts to be taught through any one activity, such as the classifications made by the standards committee, indicates that though many different combinations of activities

may be selected by a teacher, concept formation should still be ensured. There does not appear to be any concensus concerning which activities are best suited for the teaching of the concepts, nor is there concensus regarding the capabilities of the students to perform in the activities at a level high enough to ensure an understanding of the concepts. There is also an indication that the selection of teaching method is crucial if the Graphics concepts are to be taught in the present Junior High School Industrial Arts programs.

Teacher's interpretation of the curriculum guide. The judgment committee stated that in selecting his activities and intended outcomes, the teacher was not in some cases in congruence with the curriculum planners or with the standards committee. First the judges stated that the teacher was not clear in his understanding of the difference between Visual Communication and Graphic Communications. Second they observed that the teacher and the standards committee emphasized different activities than those recommended by the curriculum planners. Third the product orientation of the instruction was further evidence of the misinterpretation of the concept orientation of the curriculum guide.

As far as the curriculum guide is concerned the judges recommended that the distinction between Visual and Graphic Communications be made clearer as well as the type of activity and its relative importance in the classroom situation. They also felt that more specific objectives are required for the two curriculum units, objectives which they felt should be in behavioral form so as to clarify the intent of the curriculum planners.

In order to remedy the faulty interpretation which does in fact

occur, the data indicates that more specificity is required in the writing of the curriculum guide for Graphics.

CHAPTER V

Conclusions and Recommendations

The purpose of this study was to evaluate a curriculum unit of the Alberta Junior High School Industrial Arts program, using a model developed by Robert Stake and applied to the Industrial Arts laboratory in the city of Edmonton.

Conclusions.

The data obtained during the application of the evaluative procedures indicated that student achievement was low and that the desired outcomes were not at a level acceptable to the standards committee or to the Industrial Arts teacher (Chapter IV, page 33). The evaluative data points to the following weaknesses in the planned curriculum:

1. The intent of the curriculum planners as stated in the curriculum guide was subject to misinterpretation by the Industrial Arts teacher especially with regard to essential distinctions, the emphasis to be given various activities, and the orientation of the study. (Chapter IV, page 37.)
2. The concepts listed in the curriculum guide are not sufficiently clear to enable the Industrial Arts teacher to direct his students to a full understanding of the Graphics activities. (Chapter IV, page 36.)
3. The curriculum guide failed to outline specific teaching procedures which the judges felt necessary to ensure the desired level of student achievement. (Chapter IV, page 34.)

4. Because of low performance and participation levels as well as a lack of time, the concepts presented in the guide are unrealistically difficult. (Chapter IV, page 34-36.)
5. The validity of present methods of measuring students' understanding of the various concepts listed in the curriculum guide must be questioned. (Chapter IV, page 36.)

Recommendations.

To facilitate the achievement of students in the study of Graphics, several changes in the Graphics curriculum can be recommended:

1. Objectives in behavioral form need to be adopted by the curriculum planners as a method of informing teachers concerning the curriculum intent and to prevent teacher misinterpretation of the curriculum guide. (Chapter IV, page 37.)
2. The Graphics activities, suggested by the curriculum planners, should be carefully examined to determine which of the desired concepts they do, in fact, impart to the students. (Chapter IV, page 36.)
3. Teaching procedures, necessary to the formation of the desired concepts, must be specified for each single Graphics activity selected by the curriculum planners as content for a proposed program. (Chapter IV, page 34.)
4. In selecting activities and concepts for junior high school graphics programs, more consideration must be given to:
    a. methods of content organization in order to ensure the most efficient use of the students' class time.
    b. selection of activities suitable to the maturity of the student and the time available for the student to complete

these activities. (Chapter IV, page 34.)

5. Valid methods of measuring students' understanding of the concepts must be developed in order to write meaningful behavioral objectives for the teaching of concepts. (Chapter IV, page 36.)

The population of this study being small necessitates the limitation of any generalization to the Graphics program as it exists in other schools in the province of Alberta. The study indicated, however, that the incongruences and lack of contingencies found during this evaluation study are in fact inherent in the program. There is the possibility that the curriculum weaknesses found by this study are affecting the achievement of students generally. It is for this reason that future curriculum planners in the field of Graphics need to become cognizant of the effectiveness of curricula which have been developed.

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APPENDICES

APPENDIX I

Visual Communications Curriculum Guide

VISUAL COMMUNICATIONS

INTRODUCTION

The segments of Visual Communications as outlined in the content of this unit refer to that type of communication which is drawn, duplicated or photographed. These include experiences in drafting, duplicating methods and the study of light-sensitive materials.

The importance of graphics in the complex world of today cannot be over-emphasized. Whatever segment of our society we examine: the planning of our homes, the automation and computerization of our industries, the achievements in communications ranging from the local newspaper industry to the satellite Alouette, the beckoning of whatever deeper knowledge may lie outside the circumference of our own planet as we venture out into space, all require some form of graphics in their production.

SPECIFIC OBJECTIVES

1. To develop in the student an appreciation of the importance of graphics in all aspects of a productive society.

2. To develop an appreciation for the many applications of light-sensitive materials in a productive society.

3. To impress upon the student, through practical experiences, the importance of technical design and illustration in a complex technological society.

SUGGESTED APPROACH

The object of this unit is to provide an opportunity for the student to obtain an overall view of Technical Design and Illustration and Light Sensitive Materials. The methods and processes are such that the student can be assigned activities which will heighten his interest and give him a keener insight and better understanding of the concepts involved.

In the section on light-sensitive materials the students start with reporducing their drawings by the suggested copying methods.

Students are introduced to the complete process, from the taking of the picture to its final development. It is hoped that the students' work will include composition and darkroom procedures.

In the technical design and illustration section the stress is on expressing ideas by sketching. Partially completed drawings and exercises can be used to teach concepts. Reading of drawings is important and students should have practice to help them understand and recognize common symbols.

C O U R S E C O N T E N T

Topic A. -Graphics
Concept: -All graphic representation is either by continuous tone or dicotomous process.

Systems or Processes	Time	Student Experiences and Activities	Instructional Media
1. History and Overview of Graphics		-Investigate the development of light-sensitive materials. -Discuss the growing importance of light-sensitive materials. -Discuss the development and importance of technical design and illustration.	
2. Materials		-Investigate the wide range of light-sensitive materials. -Investigate the production of paper and ink. -Make paper if equipment available.	

Topic B. -Light-Sensitive Materials
Concept: -Light-Sensitive Materials provide the means by which the reporduction of printed and pictorial materials can be efficiently performed.

1. Copying Process		-Students learn the principles and operation of: ·Diazo method (ammonia developed) ·Intermediates, e.g., Van Dyke ·Overhead transparencies ·Wet and dry copies (Optional).	-Kodak Publications and Ansco Publications

Systems or Processes	Time	Student Experiences and Activities	Instructional Media
Copying Process (Cont'd.)		-Students should produce copy, using at least two of the aforementioned methods. -Learn use of camera. -Study camera accessories. -Apply composition to photography.	
2. Photographic Process		-Do contact printing •composition and design of Xmas cards, masks, etc. -Do simple enlarging •exposure tests •darkroom procedures •basic projection controls -Do photo drawing. (Optional)	-Ideas for Xmas cards, slides from Kodak. []
3. Film Processing		-Simulate microfilming. -Study film characteristics -Follow correct darkroom procedures.	-Slides: (Kodak) •*Choosing Your Black and White Film.* [] •*How Film is Made for Your Camera.* [] •*How to Develop Your Film.* []

Topic C. -Technical Design and Illustration
Concept: -Production depends on man's ability to express his ideas in the form of drawings and symbols.

1. Pictorial Representation -Ideas presented pictorially are easy to understand.		-Students should have practice in sketching objects in •isometric •two-point perspective	-Industrial Arts [] Transparencies (Walker)

Systems or Processes	Time	Student Experiences and Activities	Instructional Media
2. Multi-View -Ideas expressed through multi-view drawings can provide more detailed information.		-Students sketch objects in multi-view projection.	
3. Drawing Interpretation -Reading and accurate interpretation of drawings is a necessary function of many activities in society.		-Students learn to read: •dimensions •sectional views •mechanical symbols •architectural symbols •electrical symbols •topographical views.	
4. Instrument Manipulation -Through the use of instruments, drawings can be made quickly and accurately.		-Students use drafting instruments: •the drafting machine •templates •scales, etc., to make simple drawings.	
5. Composition -Good design and composition depend upon: function interest simplicity honesty (FISH)		-Students study methods of composition and principles of design related to: •advertising layout •poster design •photography -The principles of product design above should be used in the practical work as it applies to the topics in this unit.	-Locate newspaper

Topic D. -Educational and Occupational Projections
Concept: -A productive society must prepare its youth to make realistic vocational choices.

Systems or Processes	Time	Student Experiences and Activities	Instructional Media
1. Guidance Information -There are many job opportunities for highly skilled persons. -Our society depends on highly skilled labor and division of labor. -Technologists require training beyond the high school level. -The organization and management of business enterprises is an important element in a productive society.		-List the occupations in your town, district or city that require the knowledge studied in this unit.	-Pamphlets: Check with Counselling and Guidance Office

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APPENDIX II

Graphic Communications Curriculum Guide

GRAPHIC COMMUNICATIONS

INTRODUCTION

For thousands of years man has been preserving his thoughts in pictures and words; today newspapers, magazines and books provide this kind of communication. In fact, pulp and paper is one of the major products of Canada. Since printing and publishing materials is a leading industry in Canada the graphics section of industrial arts is of considerable importance to students. In this course they should become acquainted with the operations connected with printing and publishing.

OBJECTIVES

1. To develop in the student an appreciation of the importance of graphics in all aspects of a productive society.
2. To develop an appreciation for the many applications of light-sensitive materials in a productive society.
3. To develop an understanding of the relationships and the interdependency of the various divisions of labor in the areas of graphic design, process photography, platemaking, reproduction and bindery.

SUGGESTED APPROACH

This is a unit of instruction where there is an opportunity to dramatize the "systems" approach used in the printing industry. To introduce students to the activities of the unit, they are provided with a preprinted master. They print this and then are challenged to produce one of their own.

A simple project such as a personalized letterhead may be chosen as the first individual activity. To do this the student uses one of the methods suggested in the guide to set the type, take a photograph of it, reduce the size, mask it, make the plate and run the master.

Having gone through these processes the student would continue with further detailed printing. The product could be synchronized with the work of other students to produce a brochure or booklet.

SECTION A

Topic A. -Graphics
Concept: -All graphic representation is either by continuous tone or dicotomous process.

Systems or Processes	Time	Student Experiences and Activities	Instructional Media
1. History and Overview of Graphics -There has been a continuous development and improvement of materials and processes for graphic presentation.		-Study methods of printing: •rebel •intaglio •lithography •silk screen -Trace development of printing on a chronological chart starting with Gutenberg. -The following relationships should be understood: •composition •camera •platemaking •press run •bindery -Students should have a basic idea of the total procedure required to produce a printed article before going on to the individual processes.	
2. Materials -Basic graphic materials are continuously being improved to produce better graphic reproductions.		-Study the production and uses of: •aniline dye •inks •paper •stencils •carbon paper •pencils -Students may experiment with the production of a product using one of the above, view a film or make a report.	

Topic B. -Offset Lithography
Concept: -The fact that oil and water do not mix is the basic principle used in offset lithography.

Systems or Processes	Time	Student Experiences and Activities	Instructional Media
1. Offset Reproduction -The offset process has become the most commonly used industrial method of producing printed materials.		-Have students run a preprinted master (memo pads). -Pad the memos.	1. 35 mm. film strip and audio tape- 8 *"Operation of the Multilith 85"*. 2. Single Concept Loop 3. Sequential Pictorial Instruction "Preparation"
		-Examine the offset press and the wall charts. Be able to explain the 'oil and water' concept in terms of equipment.	*Graphic Arts Training in Schools* - A.M. A-M Wall Chart "Offset Principle"
2. Master Preparation		-Prepare direct-image masters, using several methods: •sign press •lettering machine •typewriter •pencil, pen and crayon •letraset	-*Making a Good Impression on Your Master* - Instruction Sheets -Letraset Instruction Sheets
3. Design		-Design and run direct-image masters for: •posters •club activities •sports activities	-A-M Idea Sheets Clipper Service

Topic C: -The Photo-Offset Process
Concept: -The total system of photo-offset lithography is dependent on the inter-relationship of diversified divisions of work.

Systems or Processes	Time	Student Experiences and Activities	Instructional Media
1. The Photo-Offset Process		-Trace the production flow of a book. Relate activities in I.A. to those in Industry. The inter-relationship of the following areas should be understood: composition camera platemaking reproduction bindery -Students should have a basic idea of the total procedure required to produce a printed article before going on to the individual processes.	-Meeta Video-Tape *"Offset Printing"* Q__O -Congoli -Unions -*Graphic Arts Training in Schools* - A.M. -*Preparing Copy for Camera* - A.M.
2. Composition		-Compose a personalized letterhead, using any of the following processes: sign press letraset lettering machine stencil idea sheets	-Instruction Sheet Clipper Service A-M Idea Sheets
3. Process Camera Simulation		-Set up a camera. -Characteristics of Ortho film. -Darkroom Procedures. -Film processing.	-Instruction Sheets

Systems or Processes	Time	Student Experiences and Activities	Instructional Media
4. Masking and Stripping		-Laying out a flat. -Stripping-in the negatives. -Corrections and deletions. -Brownline proofs.	-Cogoli
5. Platemaking		-Fastening goldenrod to plate. -Exposure procedures. -Developing and desensitizing. -Preserving the master.	-Instruction Sheets
6. Reproduction		-Preparing the offset press. -Run the letterhead.	1. 35 mm. filmstrip and tape *"Preparation of the Multilith 85"* 2. Single Concept Super 8 Loop *"Preparation"* 3. SPI - *Multilith Preparation*
7. Bindery		-Use approved bindery methods to assemble material produced. -Study methods of fastening material into books, pamphlets, etc.	

Systems or Processes	Time	Student Experiences and Activities	Instructional Media
Bindery (Cont'd.)		-Understand the meaning of: •trimming •jogging •collating •padding •stiching •perforating •creasing •mechanical binding	
8. Guidance -The student should understand interrelationship of the diversified Divisions of Work.		-The student should: 1. Know the interrelationship of the five areas in the photo-offset process. 2. Relate the industrial arts activities to those found in industry. 3. Know the divisions of labor within the printing industry. 4. Research local job opportunities, comparative salary and training required. 5. Be familiar with related technical vocabulary.	-*Graphic Arts Training Schools* - A.M. -Meeta Video Tape -Cogoli -A.M.*Graphic Arts Training In Schools* -A.M.*Putting Your School Paper to Bed.* -Cogoli - *Photo Offset Fundamentals*

Topic D. -Light-Sensitive Materials
Concept: -Exploiting varied characteristics of Light-Sensitive Material increases the versatility of the offset process.

1. Composition Through Paste Make-Up		-Simulate paste make-up on translucent paper. -Composition methods.	-A-M Idea Sheets Clipper Service

Systems or Processes	Time	Student Experiences and Activitive	Instructional Media
Composition Through Paste Make-Up (Cont'd.)		-Block out for half-tones. -Design methods using prepared translucent sheets.	
2. Positive Masters		-Positive Master characteristics. -Exposing and developing positive plates. -Use translucents for master preparation. -Run the designed product offset.	-A-M Translucents
3. Reversal Film		-Characteristics. -Exposure and developing methods. -Expose translucent paste make-up onto reversal film. -Plate make and press run.	-Instruction Sheet
4. Orthochromatic Film		-Characteristics. -Contact expose student designed translucent copy onto ortho film. -Plate make and press run. -Contact print greeting cards. -Drop out techniques. -Reversals for silk screening.	

Systems or Processes	Time	Student Experiences and Activities	Instructional Media
5. Line Color Separation		-Produce suitable copy for line separation. -Composition methods. -Negative registration. -Masking procedure. -Plate making procedure -Transparent inks. -Two-color press run.	-Translucent Separations - 33 mm. Film and Audio Tape ▶< *"Clean-Up of the Multilith 85"* Single Concept Loop SPI *"Clean-Up"* ▶<[8]
6. Projection Control In Enlarging		-Production of prints suitable for half-tones. -Filters. -Control methods.	-Kodak series McCoy-*Practical Photography* -Cogoli - *Photo-Offset Fundamentals*
7. Half-tones		-Introduction to half-tones. -Half-tone theory. -Autoscreen film. -Contact Screens. -Darkroom procedures. -Stripping half-tones for platemaking.	-Kodak Series

Topic E. -Educational and Occupational Projections
Concept: -A productive society must prepare its youth to make realistic vocational choices.

Systems or Processes	Time	Student Experiences and Activities	Instructional Media
1. Guidance			
-There are many job opportunities for highly skilled persons. -Our society depends on highly skilled labor and division of labor. -Technologists require training beyond the high school level. -The organization and management of business enterprises is an important element in a productive society.		-Investigate opportunities in one of the following: printing photography duplicating -Investigate Vocational Education training opportunities.	-Pamphlets: Check with Counselling and Guidance Office.

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APPENDIX III

Pre-test, Post-test Questions

APPENDIX III

Would you please complete the following information

(1) Name ______________________________ (2) Age __________________

(3) Grade ______________________________ (4) Girl ______ Boy ______

(5) Have you taken Industrial Arts as one of your school subjects

Yes or No

Read carefully and answer all questions, even if you do not know the correct response to a question.
Check the best response to each question.

1. Which of the following is not an example of graphic representation:

_____ a. a newspaper.
_____ b. a scale model.
_____ c. a map.
_____ d. a photograph.

2. Man's ability to express his ideas in the form of drawings and symbols;

_____ a. allows for artistic expression.
_____ b. is an essential element of modern production.
_____ c. has resulted in the establishment of libraries.
_____ d. all of the above.

3. In modern manufacturing plants ideas are communicated by;

_____ a. the use of telephones.
_____ b. the use of drawings and symbols.
_____ c. the use of television.
_____ d. by holding conference type meetings.

4. Long run photosensitive plates are usually made of;

_____ a. paper.
_____ b. tin.
_____ c. aluminum alloys.
_____ d. none of these.

5. The limiting factor in using the ammonia developing process (Blue-Ray) is that the;

_____ a. cost is prohibitive.
_____ b. ammonia fumes are very strong around the machine.
_____ c. original must be transparent.
_____ d. all of the above.

6. The proper sequence of events in printing and developing is;

_____ a. developer, fixer, stop bath, hypo clear.
_____ b. hypo clear, developer, fixer, stop bath.
_____ c. developer, stop bath, fixer, hypo clear.
_____ d. hypo clear, developer, stop bath, fixer.

7. In photocopying which of the following processes are involved;

______ a. light and heat.
______ b. chemicals.
______ c. films and papers.
______ d. all of the above.

8. Paper photosensitive plates are developed;

______ a. with a special chemical.
______ b. under red light conditions
______ c. with water.
______ d. with an acid bath.

9. Xeragraphy is a process which is based on the following;

______ a. photography and static electricity.
______ b. electrostatics and chemicals.
______ c. on a presensitized plate.
______ d. static electricity and alight sensitive paper.

10. Brownline proofs are made from screened negatives;

______ a. to determine how the finished picture will look.
______ b. to strip into the stripping sheet.
______ c. to present the negative from being mounted backwards.
______ d. to occupy a space on the dummy.

11. One advantage of using Kodak Autoscreen film is;

______ a. you don't have to use a contact screen to make the negatives.
______ b. the film is faster than plain ortho film.
______ c. the film is easier to handle.
______ d. development time is faster than with plain ortho film.

12. The negative material used for making line copy negatives is;

______ a. a high density, high constrast film
______ b. a very high quality pan film.
______ c. a very high speed ortho film.
______ d. none of these.

13. Which of the following pieces of artwork must be reproduced by the halftone process if it is to be printed by offset;

______ a. charcoal drawing.
______ b. pen and ink map.
______ c. snapshot of a person.
______ d. typewritten page.

14. In the halftone process, the picture is converted into a related pattern of ______ on the photographic negative.

______ a. fine lines
______ b. large dots.
______ c. minute dots.
______ d. large lines.

15. Work to be photographed as line copy must;

______ a. always be black copy on white background.
______ b. show no gradation of tone.
______ c. be on a folded piece of white paper.
______ d. be perfectly aligned on the dummy.

16. The screen size used for making half tone negatives is usually;

______ a. 55 lines
______ b. 500 lines
______ c. 133 lines
______ d. 68 lines

17. One of the following is not an example of half tone copy;

______ a. a photograph
______ b. a map drawing
______ c. an artists full color oil painting
______ d. an artists monochromatic wash painting.

18. If you were to become employed in the graphics industry;

______ a. there would be good job advancement if you were highly skilled.
______ b. a low level of education would be acceptable for most positions.
______ c. most of your work would envolve routine machine operations.
______ d. there would be little chance for advancement in this area.

19. The drafts man and designer are;

______ a. essential elements of modern production.
______ b. using a graphic language to communicate their ideas.
______ c. functioning seperately to modern technology.
______ d. are not essential to the automated manufacturing plant.

20. Approximately ______ percent of the industrial printing done today is done by the offset method.

______ a. 60
______ b. 70
______ c. 80
______ d. 90

21. Exposure of a plate usually takes about;

______ a. 1 minute
______ b. 5 minutes
______ c. 15 minutes
______ d. 2 minutes and 15 seconds

22. Red lithographers tape is used instead of clear tape;

______ a. because actinic light will not pass through the tape
______ b. it is easier to cut than clear tape
______ c. it is stickier than clear tape
______ d. it looks nice.

23. Film which is sensitive to all colors of light is called;

______ a. diatomic
______ b. orthochromatic
______ c. panchromatic
______ d. none of these

24. Orthochromatic film exposed to white light for a few seconds before being placed in the camera will;

______ a. be ok to use because it has not been exposed long enough to damage it.
______ b. will have to be discarded
______ c. will have to be developed before it is used in the camera.
______ d. will have to be washed and dried.

25. The color of the safelight used in the darkroom for handling ortho film is;

______ a. orange
______ b. yellow-green
______ c. red
______ d. amber

26. The advantage of the camera is the presensitized process for making metal masters is;

______ a. you reproduce fine detail and excellent quality.
______ b. fine detail is left out
______ c. you may enlarge the copy.
______ d. complicated machines are not needed

27. Extreme care must be taken in the making of the process plates to have them;

______ a. in focus
______ b. in register
______ c. colored
______ d. well inked.

28. The system of photo-offset lithography is dependent on;

______ a. the need for communication matterials
______ b. the interrelationships of diversified divisions of work
______ c. the manufacturing of paper.
______ d. the fact that water and oil do not mix.

29. The basic principle of lithography is;

______ a. ink and water will not mix
______ b. oil and water will not mix
______ c. grease and ink will not mix
______ d. platex is always used as a fountain solution.

30. Ink fog on printed sheets is usually caused by;

______ a. not enough ink
______ b. not enough water
______ c. too much ink
______ d. too much water

31. The basic principle of off-set printing is that;

______ a. ink will adhere to a raised surface.
______ b. ink and water will not mix
______ c. oil and water will not mix
______ d. ink may be picked up from an indentation.

APPENDIX IV

Anecdotal Recordings of Visual Communications

APPENDIX IV

Grade 8 Observations

Day 1.

Boy A
- takes leader position in the group
- sets type on the sign press
- puts out ink
- inks type
- cuts card to correct size
- discovers correct inking technique
- discovers correct press pressure.
- learns to run cheap paper proof to check type before using good card.
- cleans type in the sink, used solvent after first trying water
- reads instructions in preparation for the following session in the lab. This includes his becoming familiar with equipment and material used to make rubber stamps. He receives instruction in the operation of the rubber stamp machine from a friend.

A, is competent at sign press operation having produced after several tries an "average produce", by the instructors standards.

Boy B
- assumes a minor role of providing card for signs
- rolls out ink and in general aids boy A by providing card, inked roller, type and spacers.
- helps with the operation of the sign press in a minor way but does not actually operate the press
- suggests the use of proof sheets.
- helps clean type and puts it away. He does not seem to realize that type should be cleaned with solvent, he uses towels and water.

B, has not operated the press, he has assisted A in the press operation. This boy spent a large portion of the period watching others, doing busy work such as playing with the ink roller, cleaning and putting away type, or just walking around.

Boy C
- assumes a minor role compared to boy A. But seems to be more active than boy B.
- cuts card to correct size
- selects type and spacers for A
- is critical of the results and helps remedy them
- inks type
- operates the press roller
- cleans the press
- sets type
- makes a two color sign
- cleans type

C, has operated the sign press. He has produced an "average" product completely by himself.

The boys formed an efficient work group. Occasionally B did not fit into the division of labor and was excluded from the group during these periods. The exclusion of B from the activity is reflected in his failure to complete a sign of his own. There was a friendly atmosphere with verbal communication between boys in other areas. The motivation in this area during this class period was high.

Day 2.

Boy A - selects rubber stamp type
- explains operation of stamp machine to C and E
- asks boy from plastics to show him how to set type in the chaise
- finds matrix material and cuts it to size
- planes type with wooden mallet
- uses mica powder and starts to make matrix
- sets type for sign press and operates press
- helps other boys set type
- first matrix not usable
- changes type
- makes another matrix
- puts type away

A, after two attempts, manages to produce a usable matrix board.

Boy B - sets out material for sign press
- sets type and produces a sign
- cleans type using solvent and water
- learns from another boy to clean type with a rag on the sign press
- cleans the work area

B, works for the entire session on the sign press alternating with and helping boy D. These two boys appear to be enjoying themselves. Many different signs are produced.

Boy C - sets out ink for the sign press
- talks to A about rubber stamp machine
- selects rubber stamp type
- reads instructions and discusses them with A
- spends considerable time visiting out of the area
- puts away type he has selected by throwing it into the cabinet.

C, did not work at anything this period. He spent his time visiting and talking. He did observe A during most of the important operations in producing a rubber stamp matrix

Boy D - operates the sign press, sets type, produces several signs and helps clean-up.

D, spent the period working in partnership with boy B. He produced several signs and did perform all operations in the process.

Boy E - selects type for the rubber stamp machine
- locks type up in the chaise
- makes a matrix on the stamp machine, after first making a paper proof to check his type for correctness.
- stayed after class to complete his matrix.

E, did not associate with the other boys. He did have minimum contact with boy A. E tends to ask the instructor for information rather than asking other boys.

The boys have divided themselves into two work groups. There is still a friendly atmosphere with mutual help taking place. There is no exterior pressure on the boys. They are working because they desire the end product or because they enjoy doing this type of activity.

Day 3.

This is the last period before Christmas holidays. No new activities are to be started. A general clean up session has been proposed by the instructor.

Boy A - vulcanizes rubber onto his matrix,
- trims the rubber and mounts it onto mounting board. He has produced an acceptable rubber stamp
- helps with general clean-up.

Boys B, C, D - work on pre-Christmas clean-up.

Boy E - vulcanizes rubber onto his matrix
- trims the rubber and mounts it onto mounting board. He has produced an acceptable rubber stamp
- helps with general clean-up

Day 4.

Boy A - in darkroom, this is not his first time in the darkroom, he is a member of the photoclub
- puts out chemicals for paper development
- experiments with the safelight
- operates the contact printer, he varies the exposure.
- dries the prints on the print dryer
- puts away the extra print paper

A, has organized the boys in the darkroom so that each boy performs a different function. This has made an efficient

printing process.

Boy B - helps A set out the chemicals in the darkroom
- participates in experimentation with the safelights
- A, shows him how the print dryer works
- moves the prints through the various chemical baths
- performs the function of time watcher (when to change prints from one tray to the next).
- helps with clean-up.

B, has been observant, A has shown him all aspects of the contact printing process.

Boy C - helps A put out the chemicals in the darkroom
- participates in experiment with the safelights
- performs function of watching the timer
- selects the negatives for A to print
- moves prints through the various chemical solutions
- makes one contact exposure before it is time to clean-up.

C, seems to be part of the group lead by A. A, has explained the darkroom process and has organized C and B into an efficient work group. All three boys are highly motivated and wish to get started with their own pictures. They no longer wish to use those negatives provided by the instructor. The problem is that all the cameras have been sent out for repairs and as yet have not been returned.

Boy D - not in the area this period

Boy E - sets type for rubber stamp
- makes matrix
- vulcanizes the rubber
- completes the rubber stamp
- goes into the darkroom and observes the contact printing being done by A, B, C.

E, spends a lot of the class time visiting with boys in other areas and talking to the instructor. He does produce a good rubber stamp.

Day 5.

Boy A - works with the other boys in the group to ready darkroom for contact print production
- operates contact printer, exposes three pictures
- moves prints through the various chemical solutions
- operates the timer
- studies information on the use of the enlarger, but can not use the enlarger because it is broken
- dries all prints on the print dryer
- helps with the clean-up

This is a repeat of day 4, the organization moves smoothly all boys are happy. The boys change work tasks every 15 min.

Boy B - helps other boys ready the darkroom
- passes prints through the chemical baths
- works closely with A during the exposure time testing period.
- operates the timer
- operates the contact printer
- works with A studying the instructions on the enlarger.
- helps with the clean-up

B, was an active member of the work team. It can truely be said that he made an acceptable contact print.

Boy C - helps the other boys set out chemicals and equipment in the darkroom
- operates the timer
- operates the contact printer. Made exposures of 3 seconds, 2 seconds, 1 second and achieved better results than the other boys
- moves the prints through the various chemical solutions
- checks the enlarger while A and B read the instructions
- helps with the clean-up

Boy D - not in the area this period

Boy E - helps the others ready the darkroom
- operates the timer
- operates the contact printer
- moves the prints through the various chemical solutions
- checks the enlarger with C while A and B read the instructions.
- helps with the clean-up

All four boys have demonstrated the use of the contact printer. All prints after the first few test strips turned out reasonably well. Boys were unable to enlarge because the enlarger bulb was broken. There was no camera available for the students to use. All four boys worked hard and with enthusiasm. There seems to be a pleasant group atmosphere developing.

Day 6.

There is still no camera, all boys are very upset about the situation. After much grumbling the boys decide to make some prints. Boy E has a roll of film from home that he would like to develop.

Boy A - supervises the setting out of the chemicals
- adjusts negatives in the enlarger
- exposes test strips
- decides something is wrong when the tests do not turn out. Goes with the other boys to get instructor to help.
- finally it is decided that new chemicals are needed
- helps the other boys mix new chemicals
- exposes and processes another test strip, good results
- cleans up with the other boys

Boy B - helps put out the chemicals in the darkroom
- works with A on the enlarger
- spends time watching A
- helps move the test strips through the chemicals
- helps A mix new chemicals, A gives the orders.
- helps with the clean-up

Boy C - helps put out the chemicals in the darkroom
- tries to check chemicals temperature but is unable to read the thermometer
- watches A operate the enlarger
- watches the timer
- helps with the clean-up

Boy D - reads the camera instructions
- looks around and watches the other boys
- gives help to the other boys on occasion
- tells jokes to the other boys
- leaves before clean-up

Boy E - reads instructions on film processing
- observes the operation of the enlarger by A
- tells the boys to use test strips
- mixes his chemicals for film development
- puts film in the developing tank and processes it
- the film was incorrectly exposed, the result was a failure. The processing procedure was done correctly

The boys were not very productive. They did gain some insight into the use of the enlarger. They also proved their ability to follow directions and accurately mix chemicals.

Grade 8 Interview

1. a. Did you produce a sign on the sign press?
   b. How do you clean type?
   c. Does ink mix with water?
   d. What are some of the important features about the operation of the sign press?

2. a. Did you make a usable rubber stamp?
   b. How many times did you make the matrix before you produced a good one?
   c. Of what material is the matrix constructed?
   d. What are the characteristics of matrix material?
   e. Can you re-use matrix material? Why or why not?
   f. What happens to the rubber during the cooking process?
   g. Can you use any kind of rubber to make a stamp?
   h. Does the manufacturing of a rubber stamp remind you of any other process in graphics?

3. a. Did you make an ortho-graphic drawing?
   b. Do you know some uses of this type of drawing?

4. a. Did you operate the 35mm camera?
   b. Did you operate any camera?
   c. What did the f/ setting on the camera do?
   d. How can you regulate the amount of light which strikes the film in the camera?
   e. Why is it important to regulate the light which strikes the film?
   f. How do you know how much light is necessary to expose a piece of film?
   g. How do you measure the light coming from the object which you are photographing?

5. a. Do you remember which chemicals were used to develop your
   b. Did you set out the chemicals or did one of the other boys set them out?
   c. Did you load the film into the developing aprons?
   d. How did you find out how many minutes to leave your film in the chemicals?
   e. Were your negatives of good quality?
   f. What are some of the precautions which you must take when developing film?

6. a. Did you set out the chemicals for print development?
   b. Are these chemicals the same as you used for film processing?
   c. Can you develop prints in the presence of light? If yes, which type of light?
   d. In contact printing which color of light was used to expose the paper?
   e. How did you find the correct exposure time for contact printing?
   f. How did you find the length of time each print had to stay in the various chemicals?
   g. Were your contact prints of good quality? Why or why not?

7. a. How did you learn to operate the enlarger?
   b. Did you actually use the enlarger by yourself or did you work with a group of boys?
   c. How do you regulate the amount of light which strikes the print paper during exposure?
   d. Did you set out the chemicals for processing the prints?
   e. How many good enlargements did you make?
   f. How do you focus the enlarger?
   g. How do you make the print size larger?

1. Do you know what continuous tone means?
2. Do you know what dicotomous tone means?
3. Is graphic representation either continuous tone or dictomous tone or both?
4. What are efficient ways of producing poctoroal materials?
5. Is light sensitive material used to reproduce printed materials?
6. Is light sensitive material used to reproduce pictorial materials?
7. Man has the ability to express his ideas by drawing and by making symbols (t or f)?
8. Without drawings ans symbols man would be unable to produce goods?
9. Modern production depends on man's ability to use drawings and symbols?
10. Does photography interest you as a career?
11. What kinds of things would you do as a photographer?
12. Is there a good future for an ambitious young person in the graphics Industry?
13. Would you be interested to learn more about the graphics industry?
14. Do you feel that graphics is an important area of Alberta's industries?
15. Why do you feel that graphics is important or not important?
16. What are the uses of light sensitive materials?
17. How important do you feel that technical design and illustration is compared to some of the other technologies present in and around Edmonton?
18. Did you enjoy your study of the graphics area?
19. Do you feel that the things you made in class are useful?
20. What would you suggest as a change in the graphics program?

Boy A response to the Interview questions:

1. a. yes
   b. used a solution to wash
   c. no
   d. tension of roller, letters, and ink.

2. a. yes
   b. twice
   c. ----
   d. hard, orange color, easy to press
   e. no
   f. if you could line up yes
   g. no, special rubber
   h. no

3. a. no
   b. no

4. a. ----
   b. yes
   c. controls the size of hole in the shutter
   d. by using f/ and shutter speed
   e. bright days and dull days need more or less light.
   f. light meter, (type of film)
   g. light meter

5. a. yes
   b. yes
   c. yes
   d. in the book
   e. good
   f. no light, time for chemicals

6. a. yes
   b. no
   c. yes safelights (not white)
   d. white
   e. experiment
   f. looked up in instructions
   g. not bad

7. a. photo club
   b. by self
   c. f/ and filters
   d. yes
   e. two
   f. by raising up or down
   g. raise the enlarger higher

1. ----
2. ----
3. ----
4. ----
5. ----
6. ----
7. T
8. T
9. T
10. Sort of, interesting and fun, able to experiment
11. Yes, pictures, photographer, chemist, light specialist
12. yes

13. yes

14. pictures are all over

15. ----

16. blueprints are real important
17. yes
18. its fun
19. yes
20. ----

Boy B response to the Interview questions:

1. a. yes
   b. solvent
   c. no
   d. roll ink, set type backwards

2. a. no
   b. ----
   c. sort of like leather
   d. ----
   e. ----
   f. ----
   g. ----

3. a. ----
   b. ----

4. a. ----
   b. yes
   c. ----
   d. ----
   e. ruins, makes it go black if too much light, too light if not enough light.
   f. ----
   g. reading the light meter.

5. a. not really sure.
   b. one of the other boys
   c. no
   d. written on the chemical containers
   e. all black
   f. Don't turn on the lights

6. a. someone else helped
   b. think so
   c. yes, orange light
   d. white
   e. tested
   f. written on
   g. good because he was not first

7. a. did not
   b. no
   c. did not
   d. ----
   e. ----
   f. ----
   g. ----

1. no
2. no
3. both
4. ----
5. yes
6. yes
7. T
8. T
9. T
10. no doesn't like taking pictures
11. If interested, making books, posters, magazines
12. ----
13. yes
14. news media
15. ----
16. ----
17. no
18. ----
19. yes
20. need for more equipment, he had to wait for the equipment.

Boy E response to the Interview questions:

1. a. no
   b. solvent
   c. no
   d. ----

2. a. yes
   b. four
   c. ----
   d. hard, red, shiny one side
   e. no
   f. presses letters into it
   g. no, soft
   h. similar to sign printing

3. a. no
   b. no

4. a. no, broken
   b. yes
   c. regulates the amount of light
   d. shutter speed, f/
   e. too little - no picture; too much - film goes black
   f. light meter
   g. light meter

5. a. yes
   b. yes
   c. yes
   d. instructions
   e. turned on light when in the fixer so it spoiled
   f. have the correct chemicals and do not turn on the light

6. a. yes
   b. no
   c. yes, safelights, orange
   d. white
   e. from a book
   f. from a friend
   g. good

7. a. from SPI
   b. group
   c. ----
   d. no
   e. none, no time
   f. with focuser
   g. ----

1. ----
2. ----
3. ----
4. with camera and chemicals
5. ----
6. yes
7. T
8. T
9. T
10. no
11. yes photography, developing, enlarging
12. yes
13. yes
14. because it is necessary to draw a detailed sketch before you can make a machine.
15. no
16. most important
17. yes very much
18. fun
19. yes
20. does not like the way that film has to be developed in the dark, suggests that a film that can be processed in the light be developed.

Boy D response to the Interview questions:

1. a. yes
   b. use cleaner and rag
   c. yes
   d. adjust paper, letters backwards

2. a. started but did not finish
   b. did not make
   c. ----
   d. ----
   e. ----
   f. ----
   g. no did not know why
   h. reminds him of the printing machine

3. a. no
   b. no

4. a. no
   b. at home
   c. do not know
   d. ----
   e. ----
   f. ----
   g. ----

5. a. not sure
   b. others
   c. no
   d. no
   e. ----
   f. did not
   g. no light, will ruin film

6. a. no
   b. yes
   c. real dim, not sure
   d. experimented
   e. other boys
   f. not clear because chemicals were too old

7. a. ----
   b. ----
   c. ----
   d. ----
   e. ----
   f. ----
   g. ----

1. all the same tone
2. ----
3. ----
4. ----
5. no
6. yes
7. T
8. T
9. T
10. no
11. yes, not sure what graphics industry is.
12. yes
13. ----
14. ----
15. ----
16. ----
17. yes
18. get to take pictures
19. yes
20. fan in darkroom hates the smell.

Boy C response to the Interview questions:

1. a. yes
   b. put solution on rag and wipe
   c. yes
   d. put letters in backwards, tension on the roller

2. a. no
   b. ----

3. a. no
   b. ----

4. a. no
   b. yes, press
   c. ----
   d. ----
   e. turn white or black, not sure
   f. ----
   g. light meter

5. a. yes
   b. helped other boy
   c. no
   d. book
   e. ok
   f. lights out

6. a. helped
   b. not sure, thinks so
   c. yes, safelights
   d. white light
   e. experimented or guessed
   f. book
   g. ok

7. a. friend told
   b. watched someone else
   c. time
   d. helped
   e. none
   f. ----
   g. move enlarger up

1. ----
2. ----
3. ----
4. ----
5. yes
6. yes
7. T
8. yes
9. yes
10. no
11. maybe
12. photo-printing photo's, processing, enlarging
13. yes
14. ----
15. ----
16. ----
17. yes
18. it was fun making posters and prints
19. don't think so
20. longer in photography maybe if the camera had been available at first it would have been better.

APPENDIX V

Anecdotal Recordings of Graphic Communications

APPENDIX V

Grade 9 Observations

Day 1

Boy A - makes paste-up for offset master
- takes part in demonstration given by the instructor concerning the use of the BM 39 offset plate-maker
- leads the group in the use of the BM 39 to make an aluminum offset master
- uses eraser to remove unwanted marks from the master
- uses SPI as an aid in offset press operation while working with boy B
- cleans and preserves masters
- helps B run copies of a pre-made master
- cleans up

A worked in partnership for most of the period. The products produced by the boys were of excellent quality.

Boy B - helps boys use ditto machine
- takes part in demonstration given by the instructor concerning the use of the BM 39 offset plate-maker
- helps A with his paste-up
- helps with exposing and developing of an aluminum master
- rubs master with fixer solution and lacquer

uses eraser to edit unwanted marks from the master
- works with A to prepare and operate the offset press
- cleans up press after successful run
- runs off a pre-made master with the aid of boy A
- cleans up the offset press again

B seems to be the leader in the operation of the offset press The work produced during this period is of high quality.

Boy C - helps boys prepare ditto masters
- takes part in demonstration by instructor of the BM 39 offset plate-maker
- watches A and B make an offset master
- watches A and B operate the offset press
- helps B clean up the offset press

C did not do a great amount of the individual work. He did observe all activities and gave a helping hand when the need arose.

Boy D - works on the ditto machine
- makes ditto masters for the machine
- runs off several different ditto masters

Boy E - helps prepare ditto masters
- takes part in demonstration by instructor concerning the BM 39 offset plate-maker
- helps D run off copies of ditto masters
- helps with the area clean up

Day 2

Boy A - operates the BM 39 offset plate-maker with B and C
- applies lacquer to the metal master with C helping.
- Lacquer dries too quickly and spoils the master
- works with eraser to edit the spoiled master
- helps ready the offset press
- puts the paper in the press
- applies platex to the master
- puts ink in the press
- spoiled master fails to function properly, therefore, A produces a new master
- makes a third master with perfect results
- helps run copies and clean the press

Boy B - helps A operate the BM 39 offset plate-maker
- helps with the attempt to save the damaged master
- starts to ready the offset press
- runs the press
- applies fixer and lacquer to the third master
- runs copies of the master
- cleans up press

Boy C - helps A lacquer the master
- helps A and B in their attempt to salvage the spoiled offset master
- becomes active in the operation of the offset press
- helps with the clean-up

Boy D - watches others make offset masters and operate the offset press
- spends most of the period talking to a friend in another area

Boy E - watches operation of the BM 39 offset plate-maker
- watches operation of the offset press
- spends most of the period talking to a friend in another area.

Day 3

This was the first class after the Christmas holidays. There were no cameras for the students' use. The enlarger had also been sent out for repairs. The students were not happy with the area. Most of the group left to work in another area.

Boy A - selects type for rubber stamp
- locks up type and makes a matrix but type is wrongly set and must be redone.
- makes a second matrix
- vulcanizes rubber, but discovers that the type was set backwards.
- correctly makes a third matrix.

There were two other boys working to make rubber stamps. These boys were not normally assigned to this area but had nothing to do in their regular areas. Neither one of these boys was able to complete the operation of setting type.

Day 4
No cameras or enlarger for students to use.

Boy A - selects rubber stamp type
- helps boy F to set up and ready photo copy machine.
- mounts type in a chaise and locks it up.
- makes a matrix
- must remake matrix
- makes a matrix for another boy
- vulcanizes rubber in matrix board
- trims and mounts his stamp
- cleans up area

A spent a large segment of his time visiting with boys in other areas.

Boy B - selects type for rubber stamp
- checks matrix made for him by A and then helps A make a new matrix
- puts away type
- cuts mounting board
- puts rubber to vulcanize in matrix
- trims and mounts stamp
- helps clean up

B spend the greater portion of the period playing a game on the computer.

Boy C - comes into area for five periods of two to three minutes. He looks at what others are doing and leaves to work with friends in another area of the lab.
- helps with clean-up.

Boy D - selects type, never progresses beyond this phase of the process.
- leaves the area for the greater part of the period
- helps with clean-up

Boy E - not in the area for this period

Boy F - operates wet photocopier
- draws supplies
- receives help from other boys.
- has the instructor help him with the operation of the photocopier
- has trouble, but finally learns how to regulate the machine.
- observes operation of the rubber stamp machine
- cleans up in the area

Day 5

Boy A - helps boy D move BM 39 offset plate-maker into the darkroom
- asks the instructor to help prepare new chemicals for the offset plate-maker
- observes how inner part of plate-maker works
- cleans the BM 39 offset plate-maker
- helps make paste-up
- mounts a paste-up with negative paper in the plate maker vacuum frame
- exposes negative paper
- transfers negative image to a master plate
- fixes plate
- applies lacquer
- washes off master
- exposes and transfers second paste-up
- produces two more metal masters
- cleans up

inks the offset press
- edits offset masters
- prepares master for run on offset press
- helps B run press
- cleans master with blanket cleaner and removes image

Boy B - gets paper for offset press
- helps prepare paste-up
- applies fixer and lacquer to a master
- cleans up darkroom and BM 39 offset plate maker
- edits metal master
- operates offset press
- works as team with A in press operation
- cleans excess ink off the master and the blanket
- fixes and lacquers another master

Boy C - Selects type to make a rubber stamp
- talks to a friend
- locks up type with help of a friend
- first matrix failed
- makes a good matrix the second try
- vulcanizes rubber stamp
- puts away type and cleans up

Boy D - cuts paper on paper cutter
- aids A and B in making paste-ups
- applies fixer to master
- rubs lacquer on master
- helps clean the darkroom area
- edits a metal master
- mounts master on offset press
- watches A and B operate the offset press
- helps with clean-up

Boy E - not in the area

Boy F - helps a boy operate photocopier
- visits in the area several times but works in another area most of the period

Day 6

Boy A - learns to operate press camera
- loads sheet film
- reviews use of light meter
- goes with D to take pictures
- helps set out developing chemicals
- loads film into developing frames
- processes film
- cleans up

Boy B - selects type and sets up sign press
- frequently visits in another area

Boy C - selects sign press type
- visits several times in area but spends most of his time in the area
- puts away type for sign press

Boy D - works with A in learning operation of the press camera
- loads sheet film
- goes with A to take pictures
- helps set out developing chemicals
- loads film into developing frames
- helps process film
- helps clean up
- sets type for rubber stamp
- locks up type
- makes matrix
- vulcanizes rubber stamp
- rubber sticks to matrix
- vulcanizes more rubber using mica powder
- finishes making rubber stamp

Boy E - not in the area

Boy F - works on sign press with another boy
- selects type
- sets type
runs sign press
- cleans type
- sorts and puts away type
- selects type for rubber stamp
- makes a matrix
- helps put away type and cleans up

Day 7

Boy A - cleans trays and sets out chemicals in the darkroom
- washes negatives
- uses SPI to learn enlarger operation
- helps with enlargement of negative
- makes a test strip
- with D, after much experimentation, produces a reasonable print
- helps move the prints through the chemicals
- operates the print dryer
- cleans up

Boy B - sets up offset press
- demonstrates the use of the BM 39 offset plate-maker to a new group of boys
- helps boys run a master on the offset press
- leaves area and spends more than half the period in other areas

Boy C - sets type for rubber stamp
- locks up his type
- makes matrix
- vulcanizes rubber stamp
- finishes stamp
- puts away type and cleans up
- watches boys use the BM 39 offset plate-maker

Boy D - works in the darkroom
- uses enlarger with boy A
- helps experiment with correct exposure
- helps move prints through chemicals
- cleans up

Boy E - sets type for rubber stamp
- makes matrix
- vulcanizes rubber stamp
- completes stamp (poor result)
- sets type for sign press
- inks type and makes a sign
- cleans area and helps put away type

Boy F - not in the area

Day 8

Boy A - works in the darkroom with boys D and F
- helps put out the chemicals and makes an enlargement
- cleans up

Boy B - not in the area

Boy C - not in the area

Boy D - works in the darkroom with A and F
- helps put out chemicals and makes an enlargement
- cleans up

Boy E - not in the area

Boy F - works in the darkroom with A and D, he shares the activity with these two boys.

Grade 9 Interview

1. a. Did you run a pre-made master on the offset press?
   b. Did you ever operate the offset press by your-self or did you always work on the press with your friends?
   c. Why is the press called an offset press?
   d. What is the purpose of symflow solution?
   e. What would happen if you put some grease on an offset master?
   f. Does ink mix with water?

2. a. Did you make an offset master?
   b. Describe the steps you followed in making the master?
   c. Can you think of any other ways of producing offset masters?

3. a. Did you use the 35mm or the press camera?
   b. Were your pictures of good quality?
   c. What chemicals did you use to process the film?
   d. Once a piece of film is processed it is called a ____? Why?
   e. What is a halftone negative?
   f. How can you make a halftone negative?
   g. Why is it important to use a halftone negative?

4. a. Did you produce a micro-film?
   b. How could you produce a micro-film?

5. a. Did you produce a printed circuit?
   b. Can you think of a way in which you could use photography and light sensitive materials to produce printed circuits?

6. a. Did you do an orthographic drawing?
   b. For what is an orthographic drawing used?
   c. If you did not do a drawing, do you know what an orthographic drawing is?

7. a. Can you operate the offset press?
   b. How many different ways did you use to make offset masters?
   c. Can you operate a 35mm camera?
   d. Can you operate the press camera?
   e. What does f/ do?
   f. How do you regulate the amount of light which strikes the film in a camera?
   g. Did you use the enlarger to make an enlargement? If so was your enlargement of good quality?

8. What would be the effect upon our industries if there were no light sensitive materials?

9. If you were to apply for a job in the graphics industry, what types of work might you be expected to do?

10. What advantage is there in the use of light sensitive material in relation to the offset press?

11. What does continuous tone mean?
12. What does docotomous tone mean?
13. What are some of the interdependant jobs which exist in the total offset process.
14. Did you like working in the graphics area?
15. If you did like this type of work, what was it that you liked to do best?
16. What would you have liked to do in the graphics area, but were unable to complete?
17. Would you be interested in learning more about graphics?
18. Would you be interested in working for the rest of your life in the area of graphics? Why?

Boy A response to the Interview questions:

1. a. yes
   b. by self
   c. master does not have to be centered
   d. has something to do with ink
   e. it would ink up
   f. no

2. a. yes
   b. picture (paste up), mount on dummy sheet, make a negative using light sensitive paper, transfer using developer to a metal master, apply fixer and rub on, apply lacquer and rub until lines are dark, wash the master with water.
   c. photography, direct image, blueprint machine (diazo)

3. a. both
   b. good
   c. developer, stop bath, fixer, orbit bath, hypo clear agent
   d. because of the inversed colors
   e. picture produced by dots
   f. with a screen
   g. bring out different tints of light

4. a. no
   b. use something to shrink image

5. a. no
   b. no

6. a. no
   b. no

7. a. yes
   b. three
   c. yes
   d. yes
   e. controls light into the camera
   f. f/ and shutter speed
   g. yes good

8. pictures make it easy to explain things

9. drawing, operating press machines, photography

10. you can copy other pictures exactly and make a master

11. white and black

12. where there is gray tones

13. prepares masters, supplies, operates machines, sells

14. yes

15. photography

16. micro film, do color work

17. yes

18. maybe, there is lots of apparatus in this area.

Boy B response to the interview questions:

1. a. yes
   b. self
   c. ----
   d. so the ink doesn't run
   e. will cause a blotch, master will not ink in that spot
   f. doesn't

2. a. yes
   b. picture, pasteup on special sheet, put in the vacuum press with the yellow side of the negative paper next to the pastup, expsoe the negative paper, transfer the image to the metal master plate using developer, apply fixer to the plate, lacquer the image, wash the plate with water
   c. direct image, type or draw, take a picture and make a master

3. a. no
   b. ----
   c. ----
   d. print finished copy
   e. from dark contrast to lighter in grades
   f. ----

4. a. no
   b. no

5. a. no
   b. no

6. a. ----
   b. ----
   c. ----

7. a. yes
   b. two
   c. ----
   d. ----
   e. ----
   f. ----
   g. ----

8. no pictures

9. offset operator, photographer, block printing, rubber stamp manufacturing, archetect, artist

10. copy in more detail

11. all the same

12. ----

13. make a master, run the press, clean the press, store masters, maintenance
14. yes
15. making and running masters for the offset press
16. photography
17. yes
18. not really, not that interested.

Boy C response to the interview questions:

1. a. no
   b. no
   c. --
   d. --
   e. --
   f. no

2. a. yes
   b. design copy, use vacuum frame, not sure
   c. no

3. a. no

4. a. --

5. a. --

6. a. --

7. a. --
   b. one

8. could make plans

9. rubber stamp, design

10. ----

11. ----

12. ----

13. newspaper magazines

14. yes

15. making print on offset

16. ----

17. no

18. no, better things to do

Boy D response to the interview questions:

1. a. no
   b. no
   c. because it puts one image to the other image
   d. to keep ink from area where there is no image
   e. ink would not stick
   f. no

2. a. yes
   b. make copy, expose with light sensitive paper to produce a negative, transfer to a metal plate by using developer, put on soapy solution, apply red ink and rub, wash with water
   c. direct image

3. a. yes both
   b. some good some not so good
   c. developer, stop bath, fixer, orbit bath, water
   d. negative, because of backwards image
   e. includes gray tones
   f. ----
   g. you would get no tones (just black and white)

4. a. ----

5. a. ----

6. a. no
   b. three dimension shapes in drafting
   c. sort of

7. a. maybe
   b. saw two ways done
   c. yes
   d. yes
   e. controls the lens opening
   f. f/ and the time
   g. yes good

8. no tv's, no film industry, harder to make publications and advertisements

9. make a master, run offset press, do drawings, photography, set type and do printing

10. better detail and high speed

11. goes from darker to lighter gradually

12. black and white

13. master preparation, operate the press, supply paper, clean up

14. yes

15. photography

16. drafting

17. yes

18. maybe, depends on the situation

Boy E response to the interview questions:

1. a. no
   b. --
   c. --
   d. --
   e. ink would stick to it
   f. no
2. a. --
3. a. press camera
   b. negatives were good
   c. developer, fixer
   d. negative because it is the opposite way
4. a. ----
5. a. ----
6. a. ----
   b. maps
7. a. ----
   b. none
   c. last year
   d. yes
   e. controls the shutter opening
   f. time
   g. yes ok.
8. no detailed prints, no large amount of copy work, no photographs
9. darkroom, offset press, making drawings, drafting, signs, stamps
10. make more detailed masters
11. ----
12. ----
13. make master, operate machine
14. yes
15. photographs
16. offset
17. yes
18. not sure, better careers of more interest

Boy F response to the interview questions:

1. a. no
   b. no
   c. --
   d. --
   e. --
   f. --

2. a. no
   b. --
   c. --

3. a. no
   b. fair
   c. ----
   d. negatives
   e. ----
   f. ----
   g. ----

4. a. no
   b. --

5. a. no
   b. --

6. a. no
   b. --
   c. --

7. a. --
   b. --
   c. think so
   d. no
   e. something about light
   f. --
   g. yes

8. no pictures

9. copy, photography, making enlargements, printing.

10. ----

11. ----

12. ----

13. ----

14. yes

15. not sure

16. work on the offset press

17. yes

18. no

APPENDIX VI

Comments of the Standards Committee

APPENDIX VI

Standards Committee Comments

Rubber stamp - students should know the process
- student should know materials used and the characteristics of the material.
- student should be able to explain the correspondence between the matrix and aspects of the offset process.

Type setting - only as it is used in other activities.
- no value to this activity.

Sign press - produce an acceptable product
- know about reverse position of type
- student should be able to justify his layout. in terms of the simple rules of composition.

Use of Cameras - student should know the operation procedure
- student should be aware of depth of field, flash operation, flood lighting, the fact that he is using light sensitive materials.
- specificity of assignment for good first product is desirable
- student should be able to explain the procedure used to process the film
- student should be able to explain the errors that occur in his product.

Contact printing - use a normal negative and produce an exposure test strip
- know the correct process for developing prints
- this would best be done prior to film exposure or development.

Enlarging - student should be able to explain the principle of enlarging
- student must be able to operate the enlarger, (know procedure)
- student should make test strips and be able to differentiate between a contrasty, normal or flat negative.

Micro film - produce a product of usable quality
- student should know why micro-filming is important

Printed Circuit - student should know the process
- demonstration of the process by making a product that will be used in electronics, quality will be determined by whether or not it functions.

- layout of components, drawing of circuit, reduction of drawing, etching of plate, construction of completed electronic product.

Drafting
Multi view - students should be able to visualize and sketch orthographic drawings from isometric and or oblique drawings

Sketch oblique - to learn what sketching is
isometric - student should continue until the axis
perspective lines are easy for him to reproduce.

Drafting plate - use drafting machine, templates, scales to make an orthographic drawing
- should know standard procedures for making a drawing
- should reproduce the drawing using the diazo process.

Spirit Duplication - students should know the process
- students should be able to explain the advantages and disadvantages.

Offset familiarization - students should follow instructions in SPI and run good copies of pre-made masters

Direct Image Master - student should prepare one master using available media
- student should be able to explain the offset principle using the machine to demonstrate.
- student should be able to follow SPI procedure and operate the offset press

Letter Head - correct layout
- stress placed on correct procedure
- quality of photograph or finished copy must not be emphasized
- better students may use two colors

Photo Offset Simulation - have students use transluscent originals and produce a two-color line seperation
- students learn the diazzo process
- students should understand the similarity between the diazzo process and the photo offset process

Photo Offset and
Half Tone Work - this activity is considered too difficult for junior high
- student should be able to explain how he got his negative and why he needs it.

- student should understand the need to convert to a dot pattern.
- correct procedure is important

Occupations and Field trips - research into division of labor, salary, education required, training, employment opportunities. Do as class project.
- student should be able to verbally outline the functions of the various departments in a graphics print shop

Make paper - students should be able to explain the process of making paper
- to actually make paper is not important

Drypoint etching - of no value

Graphics introduction - of little value

Make a chart - have each student contribute one item to large chart

Common words - students should be required to use the correct terms during their lab period.

Graphics material - student should research and write a report of one or two pages.
- better students may prepare an audio tape to be stored in the resource centre.

Graphics Industry - the students should be aware of what constitutes the graphics industry

Design - students should show application of design principles to photography and advertising signs.

Memo pad - of no value

APPENDIX VII

Comments of the Judgments Committee

APPENDIX VII

Comments of the Judgments Committee

The expected IQ in the antecedents intents column was normal but boys B, C, and D were below normal.

Boy A had previous experience which could have resulted in his higher pre-test score. Perhaps boy A had completed the teacher's objectives even before he started the program.

The validity of the pre-test was questioned because it did not discriminate. The committee felt that the boy having an IQ of 130 should have done better than the boys with lower intelligence quotients. The wording of the questions was considered a partial cause of pre-test invalidity.

The intelligent student will not necessarily do well in I.A. The fallacious assumption that the intelligent child will be a high achiever in I.A. is reflected in the expectation that boy A show more improvement than others because of his higher IQ. Consideration must be given to the fact that boy A scored high on the non-verbal test. This would indicate a high level of manipulative skill.

The antecedents listed in the intents and standards are realistic for grade 8 students. It was felt that the IQ of the group was low, and was not necessarily representative of the average IQ of the class.

Sign Press

This activity was not attempted by boy E. It was considered important that each boy actually complete all aspects of the activity in order to fulfill the intents of his teacher. There was congruence between intents and standards for this activity. Results of the post-test indicated that boy E may have learned without actually doing the activity. Boy E showed growth on the test but had not participated in many activities. Boy D also failed to complete most activities. This may also have been an indication that boy E was more capable than was expected. He might have learned through observation of activities.

Rubber Stamp

This activity is not included in the curriculum. It should be considered as an extra enrichment activity. Most of the boys did not participate in this activity.

The standards committee's placement of the rubber stamp and sign press activities in both VC and GC is incorrect.

It was the feeling of the committee that:

(a) relationship should be made between the rubber stamp and the offset press activities.

(b) relationship should be made between the sign press and the platten press activities.

The judgment committee felt that a need for change either the activities or concepts was indicated.

The observation column shows that the sign press and rubber stamp were performed at level I. This indicates that little concept learning had occured. The judgment committee agreed that at least a level III performance is required to indicate that an understanding of the concepts has been achieved.

The sign press and rubber stamp activities are the only activities which could contribute to student understanding because, at grade 8 level, the operation of this equipment is simple enough to allow in depth study of the processes. Most activities must be demonstrated by the instructor before any learning will take place. However, operation of the sign press and rubber stamp machine are activities which could be carried out by the students without teacher instruction, and which could convey concepts to pupils. For these two activities, the level of performance set by the standards committee is considered to be too low.

Drafting

The curriculum planners thought that technical design especially sketching, was very important. The teacher of the class observed did not share this belief; nor did the standards committee. The judgment committee seemed concerned over the teacher's attitude towards drafting. There is an incongruence between intents and standards concerning the emphasis which should be placed upon drawing or sketching. The committee believed that the students should have been compelled to complete this activity. Perhaps the teacher's tendency toward permissiveness is incongruent with the original intent of the curriculum planners or the standards committee. Because they were free to choose, many boys spent less time doing activities in the area than others. The committee felt that this freedom was not advisable at the junior high school level. In senior high school it may, however, be acceptable.

Activities 4, 5 and 6

Contact printing should have been done using the students' own negatives, but the idea that students should first carry out this activity using a standard negative has value. The resulting good job should act as a motivating factor for the students in the area.

The intents and standards are clear, but the committee felt that the teacher should do more demonstrating. This would avoid wastage of time by the students. It is likely that boy A was the demonstrator in the darkroom, but the committee is of the opinion that his performance should have been checked before he did so. Boy A deomonstrated that he could do the activities correctly and perhaps he also instructed adequately. The teacher may have been perceptive in allowing this boy to do the instructing. A's leadership ability was displayed. Perhaps his higher IQ explains his assumption of this role. The other boys did more observation, perhaps because boy A was too dominant. For this reason, what was observed might not have been what was intended by the teacher.

The students did not have experience on all machines or in all

processes. There appears to have been a complete lack of structure. There was also a lack of discussion between the students and the teacher. It was suggested by the committee that perhaps discussion is necessary to aid in the understanding of concepts. The students should be brought into a group and allowed to discuss their ideas. In this way they may gain more understanding.

Operations not intended by the teacher

These activities should have been included in the intents column.

The reading ability of the group was low. For this reason a wall chart depicting the division of labor and occupations would be a desirable teaching aid. The level of performance set by the standards committee for this discussion activity is excessively high. The standard set for the paper making activity is acceptable. It is believed that the student would enjoy a participation in this activity.

Insufficient time was available for the graphics material activity. This should be an extra project for the one boy in ten who is capable of doing extra work at home and who can explain to the rest of the class. A top student like boy A should have been able to do this activity. The committee places the rubber stamp in this cateogry.

The topic of microfilm should have been placed in VC rather than GC. The standard set for this activity is acceptable but the level of performance required is perhaps too high.

Definition of VC - anything to do with the photographic process.

Definition of GC - anything to do with the printing process.

In the chart made by the standards committee each activity was placed in either VC or GC, or in both areas. Incongruence arises because, if there is a distinct difference between what is suggested for VC or GC, X's would appear in either the GC section or the VC section of the chart but never in both. This chart of standards committee expectations does not show a difference between the activities of the two units or the concepts they teach.

A question was raised concerning the necessity of differentiating between VC and GC. Would not one topic title "Graphics" solve the problem of this interrelation? It was stated that it is an administrative necessity to divide the program. The point was raised that the concepts and objectives are so general that one can, in fact, put X's all over the chart. This problem could be solved by provision of more specific or behavioral objectives for VC and GC.

Influence of the old IA curriculum in which GC was what is now called VC, could affect the ability to distinguish between VC and GC as outlined in the new curriculum. Perhaps the standards committee was unable to differentiate because of its background. One member of the judgment committee felt that there should be a definite separation if the curriculum was a basis of the standards, because, in his opinion, the curriculum does not have this overlap.

What the standards committee produced is a misture of teacher intents and curriculum guide statements. It was pointed out that, by definition, an incongruence exists if the sign press and contact printing activities are placed in the same unit of study, because contact printing is definitely a part of VC, while the sign press work belongs in GC.

It was agreed that perhaps the teacher and the standards committee were not certain of the VC-GC differentiation criteria because of the late issuing of the curriculum guide. The committee agreed that an incongruence exists between what is being done and when, and the original intents of the curriculum planners. People are not interpreting the curriculum guide correctly. They are misinterpreting the division between GC and VC. It was again pointed out that it is necessary to break the field into two units for managerial reasons only. A member of the committee then remarked that perhaps no real differentiation exists. The end outcome according to this person, is all important, and the mixture of activities is irrelevant. If a varied mixture of activities does in fact occur, perhaps the standard committee's categorizing of activities as fulfilling both VC and GC concepts and objectives is desirable; i.e., a student may use the sign press in visual communications, he may again use it in the graphic communication unit in the accomplishment of another goal rather than as an activity in itself. However, there does exist a problem of time if activities are continually repeated.

Either the pre-test/post-test is invalid, the students lacked initiative or interest, or the concepts are not learned. The test could be testing content and not concepts, or perhaps the persons sorting the questions sorted for concept, but at a different level than that achieved by students. There is the possibility that the sorters did not understand the concept.

PPI's should be used in learning to operate equipment so that the student can then learn concepts using the equipment as an aid. If the student operates the equipment but does not pursue the concepts, the learning process is not being accomplished. If the students are only learning machine operations, the judgment committee believes that the students would soon lose interest and cease working.

From the observations, the committee felt that the gap between machine operation and concept learning is not being bridged. The concepts are not, in fact, being understood. This may not be serious since the concepts had only been introduced for a short period of time. Perhaps more time is needed to develop the teaching technique. Content and skill still is being measured because principals demand a letter grade type of mark. Perhaps the pre-test/post-test items, being content oriented, do not, in fact, measure the concepts. The low post-test score could be the result of both the test measuring content and the teacher's failure to teach the concepts. In order to understand concepts, the student must perform at a level greater than level I. Performance up to level III or IV is required before the student would be functioning at a stage past simple machine operation. When a student is able to compare a sign press to an offset press, he has mastered the concept. If a student can operate both the sign press and the offset press without seeing the relationship between the two, then he has missed the concept. From the observations, the committee felt that machine operation was accomplished in many cases, but that the concepts were not grasped. The intent of the curriculum planners in including the sign press as an

activity was that of illustrating the relationship of this activity to other activities. The rubber stamp activity is included for a similar purpose. However an awareness of activity interrelationships is seldom developed.

The students merely master machine operation, and hence, they have missed the concepts. This is why there must be discussion for the purpose of jelling the concepts in the minds of the students.

Perhaps the student should be required to make two identical products -- one on the sign press, and one on the offset press. Then he might be asked to explain the difference between the two products.

The judgments committee did not agree with the level of performance for the activities set by standards committee. No concensus was reached as to what the levels should be. It was suggested and agreed that VC activities should require performance at level I or II. The students must be shown how to perform the operations. If this is not done, student time and materials are wasted. One example of this waste was observed when boy A completed many test strips when one is all that is necessary.

The level of performance in VC will be lower than the level in GC. For example, the use of a camera in VC requires level I performance but in GC the performance would be level III or level IV because of the student's background.

The concepts as listed would not be understood without at least a level III or IV performance and the expectation of performance at such a level is perhaps unrealistic for junior high. There is some feeling however that perhaps this level of performance may possibly be achieved.

What are the concepts? They are basic ideas which are to be built up within the student from year to year. The building up process has failed to occur, and thus, conflict has resulted. As in science courses, the teacher must take the basic concepts and build them up through grades 7, 8, 9, 10, 11, and 12. Each time the student is in a particular area, his performance level increases until he finally understands the concepts associated with the area. The low post-test scores may be partially caused by the fact that the students have not had sufficient exposure in an area to ensure a level of performance high enough to indicate an understanding of the concept. Perhaps the concept is being tested at too high a level for grade 8 and 9. This happens if the questions are too sophisticated. It is the level of the questions which may be important in testing. For example, after studies in VC, grade 8 students may not know why certain things happen, but they do know that they happen.

The judgment committee agreed that the intents of the teacher are not congruent with the intent of the curriculum planners in all cases. In general, the standards are acceptable. It was felt that the standards committee did a creditable job in setting standards for the Visual Communications unit of study.

Graphic Communications

Incongruence exists in the antecedents. The standards committee expected the students to know the operation of equipment which they had used in VC, but the observations indicated that the boys knew the location of instruction booklets and the names of the equipment only. It is

evident that the students came into the GC program with a level of performance far below the level expected by the standards committee. For example, boy A had to make three matrices before completing one correctly. He had previously made a rubber stamp in his grade 8, VC class. This indicates that he had not remembered how to operate the machine. Since the antecedents set by the standards committee are too high, the remaining standards set for GC will also be too high. The point was raised as to the importance of students being able to operate equipment. Familiarity with procedures and a knowledge of the location of instructions may have been a more reasonable expectation, especially since machine operation is not one of the stated objectives of the course.

Observations

Boy C's low IQ was incongruent with the intent. Perhaps the instructor should have foreseen that the occasional student would have low ability. Since he is using his school as a base for setting his intent, he may have been justified in his expectation that students would be of normal intelligence. The standards committee had set a realistic expectation for student ability.

Offset Press

It was noted that most of the boys were observing the operation without actually taking part. This was felt to be incongruent with the intent. If the instructor expected the boys to run the press, then the program should have been organized in such a manner as to allow each student the opportunity to actually operate the machine. The committee agreed that a basic program should be set at a level beyond which at least one half the students are able to achieve.

Boy C had a low post-test score. Perhaps this was because C spent considerable time out of the area visiting with friends. This effect was not considered desirable. It was felt that the teacher should have presented a program with a sound structure, both student-wise and instruction-wise. Students should not have the right to visit or to do other things until they have completed the basic processes in their area to a satisfactory level.

The suggestion was made that both VC and GC be taught in grade 9 simultaneously. Such scheduling would easily secure provincial approval. Student time wastage would be eliminated and repetition of operations would be avoided (E.g., the use of a camera is learned in VC. If this is taken in grade 8, the boy forgets the procedure and must relearn the operation for GC. However, if he learned the use of the camera, and then, in the same year, he used that camera as an aid in the printing processes, the concepts would be more readily learned. Basically, the two units should be taught in sequence, without a break, if an understanding of the concepts is to be achieved. The application of photography in printing does not allow much latitude on a screened negative.) The use of the offset plate-maker was not recommended for junior high schools. Since it was not automated, the machine was a useful teaching aid, but cost is an important factor to consider.

The making of microfilm should be included in VC, not in GC. The use of the spirit duplicator, rubber stamp machine, the sign press and photo copier are all considered as enrichment activities. If a student uses all these machines, he should become aware of the different methods of printing. Cost is a factor to be considered. The intent of the curriculum is to keep the cost down, but to still allow for a basic instruction.

The standards are considered to be too high, and are perhaps more suitable for grade 10 students. There seem to be too many activities, and thus the students are unable to accomplish the intents in the allotted time.

Drafting should not have been included in GC.

The printed circuit is a good enrichment activity, but most of the project would have to be completed in the electronics area.

The level of expected performance is too high. Under the organizational method practiced by the teacher, the students would never meet the levels established for performance by the standards committee. The judgment committee agreed that freedom for the student would not result in the achievement, in the allotted time, of established performance levels. The standards are incongruent with the observed performance of the students. In the case observed, the students wasted so much time that the desired learning could not take place.

Outcomes

The teacher is inconsistent in his statement that only objective #2 would be learned by the students. The judgment committee agreed that the intended outcomes of the teacher are not logical. They believed that the teacher could have taught some understanding of the concepts and objectives if he had so desired.

The GC level of expected performance is higher than the VC. This is correct, but the levels of performance, in most cases, were considered too high for junior high school. For example, few students would have seen a printed circuit. Therefore the expectation of performance above level I in this area would be unrealistic.

The observations indicate that the students were not led to an understanding of the concepts. This had an affect upon student performance on the post-test. If students are allowed excessive freedom, they will omit important sections of the program, with the possible result that they may unlearn concepts.

Achievement does not seem to be related to intelligence. The judgment committee felt that interest is the dominant factor, especially in cases where students are allowed to follow their individual inclinations. They felt that the interest factor should be played upon by the teacher. This would eventually lead to activities which would increase the growth of the student.

The intents column was too vague. This column should be more definite and should have set standards. The teacher should design his program using behavioral objectives. The standards, as set for VC and GC, are realistic for high average and above average students. Students such as boy C in GC should have had more guidance from the instructor. Realistic standards are necessary if students such as this are to remain interested and are to eventually achieve an understanding of the concepts.

- The course objectives were not achieved.
- The intents of the instructor were not achieved.
- The objectives should be in behavioral terms to make them more realistic.
- There is doubt as to whether the concepts actually interpret the objectives.
- It is felt that teachers are perhaps still product-oriented.
- To orient the teachers, it was suggested that the curriculum guides be written in behavioral terms.
- There was fear expressed that curriculum guides written in behavioral terms would infringe upon the teacher's freedom.
- The standards committee placement of activities under concepts and objectives indicates that ten different teachers may all have different activities and still teach the concepts. The important outcome is that the concepts are learned.

APPENDIX VIII

Charts on Back Cover in an Envelope

CHART 1
VISUAL COMMUNICATIONS MATRIX

NTS

pm as IQ test, will be normal or above.

m of C or better in their previous

Arts experience in the previous school will have been in the Graphics area.

ent age group.

ten sign on the sign press.

nt neatly made sign.

rubber stamp.

rix.

ng board.

ceable stamp.

will make one drawing.

ortho graphic drawings. the drawing.

ts a 35 mm camera. s. 3 of these should be given the

processing. ng work.

processing. duced in 4 and 5 above. ts.

nt.

ts experience in visual communications: ity.

rging. sed film.

he exposed.

es meet objectives or aid in the

the students in the visual communications

ld and Moredock 1957, p. 204.

remembering.

remembering, recalling, classifying.

estimating, reformulating, illustrating.

predicting, estimating, interpreting. is, drawing inferences.

organizing, formulating new hypothesis, s and problems.

ractice of the importance of graphics riety.

he many applications of light-sensitive y.

ough practical experience, the importance tion in a complex technological society.

OBSERVATIONS

The ability of the grade 8 students as shown by an Otis IQ test score was as follows:

Boy A - verbal score 112, nonverbal score 130
Boy B - verbal score 75, nonverbal score 80
Boy C - verbal score 85, nonverbal score 98
Boy D - verbal score 85, nonverbal score 90
Boy E - verbal score 100, nonverbal score 85

The marks received by these students in their previous school year were not available. To pass from grade 7 to grade 8 required an average mark of C. All boys in the study had been in grade 7 the previous year.

All students in the study had previous experience in a grade 7 Industrial Arts program. Boy A had previous experience in the graphics area due to his membership in the photo club.

The ages of the grade 8 students in the study were:

Boy A - 13
Boy B - 14
Boy C - 13
Boy D - 14
Boy E - 13

On the pretest the students made the following scores:

Boy A - 15
Boy B - 12
Boy C - 9
Boy D - 7
Boy E - 14   Note: All pretest scores are out of a possible 31.

Use of the Sign Press

Boy A completed this activity working with other boys in his group. This boy used one class period to complete this activity.

Boy B completed this activity working with other boys in his group. This boy used two class periods to complete this activity.

Boy C completed this activity working with other boys in his group. This boy used one full class period and part of a second period to complete this activity.

Boy D completed this activity working with other boys in his group. This boy worked for one class period on this activity.

Boy E did not attempt this activity.

Making a Rubber Stamp

Boy A completed this project in one and one half class periods.

Boy B did not participate in this activity.

Boy C started this activity but stopped before he had his type mounted in a chase.

Boy D did not participate in this activity.

Boy E completed this activity in one and one half class periods.

Drafting

This activity was not attempted by any of the boys observed.

Film Exposure

For this activity the press camera was used, as the 35 mm camera had been broken.

Boy A worked with one other boy from the group. He loaded sheet film and made two exposures. This activity took about one half of one period.

Boy B worked with one boy from the group. He loaded sheet film and made two exposures. This activity was done in about one quarter of one period.

Boy C worked with one other boy from the group to load sheet film and make two exposures. This activity took about one half of one period.

Boy D read camera instructions but did not take an active part in the activity.

Boy E worked with one other boy from the group and loaded sheet film. He made two exposures. This activity took about one quarter of one period.

Film Processing

Boy A did not set out the chemicals. He loaded film into film clips and correctly processed two 2¼ by 3¼ negatives. His results were good.

Boy B set out chemicals for film processing. While waiting for the camera he experimented with a piece of exposed film, with the lights on. He correctly loaded his film into film clip but during development the lights were turned on and light spoiled his negatives.

Boy C worked with boy A and had a similar quality negative.

Boy D did not take part in this activity.

Boy E worked with boy B and failed to produce a good negative.

Contact Print Making

Boy A organized the printing operation. The boys in this group used old negatives because the camera had not returned from repairs. Boy A completed all operations of the printing process. After much trial and error he was able to produce correctly exposed and developed prints.

Boy B worked under the direction of boy A. He performed all operations of the printing process.

Boy C worked under the direction of boy A. He performed all operations of the printing process.

Boy D was involved slightly in the activity.

Boy E did not work with the group on the first session in the darkroom. On the second day he performed all operations of the printing process.

The boys spent two class periods making contact prints.

Enlarging

Boy A worked on the enlarger with other boys from his group. The boys had trouble getting the correct light settings, as a result no finished prints were produced. Boy A did demonstrate that he knew how to put negatives into the enlarger and how to focus the image. He did produce several test strips.

Boy B worked with boy A on the enlarger. He did not take an active part in the operation.

Boy C worked with boy A on the enlarger. He looked after the chemical processing and only observed the operation of the enlarger.

Boy D did not take an active part in the enlarger operation.

Boy E worked only partly with the boys as they operated the enlarger. He was in the darkroom during this time.

The group spent one class period working with the enlarger.

Pre-test, Post-test Results

		Concept 1			Concept 2						Concept 3							Concept 4			Concept 5					Concept 6			Concept 7				Total out of
		1	2	3	4	6	8	9	10	26	11	12	13	14	15	16	17	18	19	20	5	21	23	24	25	7	22	27	28	29	30	31	31
Boy A	Pre-test	1	1	0	0	1	1	0	0	0	1	0	0	0	1	1	0	1	1	0	0	0	1	1	1	1	1	1	0	0	0	0	15
	Post-test	0	1	0	0	1	1	0	0	0	0	0	1	1	0	0	0	1	1	0	0	1	1	1	0	0	1	0	0	1	1	0	13
Boy B	Pre-test	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	1	0	0	1	1	0	1	0	1	1	0	0	12
	Post-test	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0	0	1	0	1	1	0	1	1	0	0	1	0	10
Boy C	Pre-test	1	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	9
	Post-test	1	0	1	1	1	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	1	0	1	11
Boy D	Pre-test	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0	7
	Post-test	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	1	1	1	0	1	1	0	0	12
Boy E	Pre-test	1	1	0	1	0	1	1	0	0	1	0	1	1	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	1	1	0	14
	Post-test	1	0	1	1	1	1	0	0	0	0	0	1	1	0	1	1	1	1	1	0	0	1	1	0	0	1	0	0	1	0	0	16

* 1 indicates a correct response to the test question.
0 indicates an incorrect response to the test question.

Concept 1. VC topic C	- Civilization depends upon man's ability to express his ideas in the form of drawings and symbols.
Concept 2. GC topic C	- The total system of photo-offset lithography is dependent on the interrelationship of diversified divisions of work.
Concept 3. VC GC topic A	- All graphic representation is either by continuous tone or discontinuous process.
Concept 4. VC topic D GC topic E	- A productive society must prepare its youth to make realistic vocational choices.
Concept 5. VC topic B	- Light sensitive materials provide the means by which the reproduction of printed and pictorial materials can be efficiently performed.
Concept 6. GC topic B	- Exploring varied characteristics of light-sensitive material increases the versatility of the offset process.
Concept 7. GC topic B	- The fact that oil and water do not mix is the basic principle used in offset lithography.

The students in visual communications performed the intended activities at the levels of performance indicated on the chart below:

Activity	Boy A	Boy B	Boy C	Boy D	Boy E
1	I	I	I	I	
2	I				I
3					
4 & 5	IV	II	II		IV
6	III	I	I	I	I
7	IV		I		

STANDARDS

The students in Visual Communications will be boys and girls in grade 8 or grade 9.

The ability of the students will vary from very high to very low. It was expected that very low ability students would not be enrolled in most Industrial Arts laboratories.

For the study of Visual Communications, students would not, in most cases, have had any previous practical experience. Most of the students would have had exposure to the content of visual communications, at home, on TV, in the newspapers, before they study it in Industrial Arts.

Sign Press

The student will make a rough layout of his sign.

Type will be set as indicated on the layout.

The type will be inked and a proof copy made.

The type will be re-inked and good copies made.

Clean-up.

Rubber Stamp

The student will read the related information on type and type setting.

The student will read the related information on materials and procedures used in making a rubber stamp.

The student will set type.

The student will make a matrix.

The student will vulcanize the rubber.

The student will mount the stamp.

Drafting

Given isometric or oblique drawings of an object the student will visualize and make a multiview sketch of the object.

Given multiview drawings the student will make oblique, isometric and perspective sketches of the object.

The student will make one multiview drawing of an object using a drafting machine, templates and scales. A blue line print will be made of the drawing using the diazo process.

Use of a Camera

The student will read or take part in an audio-visual presentation on such topics as: the camera; the light meter; flash and flood lights; depth of field; films; print paper; processing techniques.

The student will take several pictures with a camera under conditions controlled by the instructor. Lights, background, etc. should be teacher set up initially. A good first product is essential.

The student will develop his film following the instructions set out by the teacher.

Contact Print Making

It is recommended that this activity be completed before the student uses a camera.

Using a normal negative and 1-2 velox paper, supplied by the instructor, the student will expose test strips and make a contact print.

The student will read the instructions on print development, and follow the procedure in processing his test strips and contact print.

Enlarging

The student will follow the provided instructions and operate the enlarger.
a. the student will produce enlargements of negatives that he made.
b. the student will use polycontrast paper and make the necessary adjustments to the filters to produce correct contrast in his prints.
c. the student will make test strips to find the correct exposure.
d. the student will process the prints by following the provided instructions.

Occupational Opportunities

By reading related information or by taking a field trip the student should be able to:
- list the divisions of labor.
- list the salary, education required, training, employment opportunities.

Make Paper

The student should be able to explain the process of making paper after:
- he reads the related information on the subject.
- after actually making paper in the lab.

Graphics Introduction

The student should participate in a presentation outlining the area of graphics. This presentation may be in the form of related readings, tape and slides, movies, or slide tape presentations.

Graphics Chart

This chart should be a chronological presentation showing the significant development of printing starting with Gutenberg. This activity should be a classroom display supplemented with contributions from the students.

Use of Common Words

The students should be encouraged to use technical vocabulary in all their lab work.

Graphics Materials

The student should be encouraged to research the production and use of various materials in graphic reproduction. The student should make a report on a slide and tape presentation to be added to the resource center in the graphics area.

Design

The basic principles of design should be outlined for the student. The student should use the principles of design in a criticism of premade posters and plates.

	VISUAL COMMUNICATIONS OBJECTIVES			TOPIC				GRAPHIC COMMUNICATIONS OBJECTIVES			TOPIC				
ACTIVITY	1	2	3	A	B	C	D	1	2	3	A	B	C	D	E
RUBBER STAMP MAKING	X									X			X		
SIGN PRESS	X		X					X		X					
USE OF CAMERA	X	X			X			X	X			X	X		
CONTACT PRINTING	X	X			X			X	X					X	
ENLARGING	X	X			X			X	X				X		
MICROFILM	X	X			X			X	X						
PRINTED CIRCUIT	X	X	X		X			X	X	X			X		
MULTIVIEW SKETCHES	X		X			X		X		X					
DRAFTING PLATE	X		X		X	X		X							
SKETCHING	X		X			X		X		X					
SPIRIT DUPLICATION	X							X							
OFFSET FAMILIARIZATION				X				X		X		X	X		
DIRECT IMAGE MASTER	X			X				X		X		X	X		
LETTER HEAD	X	X		X	X		X	X	X	X		X	X		
PHOTO OFFSET SIMULATION	X	X		X	X		X	X	X	X		X	X		
PHOTO OFFSET WORK	X	X	X	X	X			X	X	X	X	X	X	X	
OCCUPATIONS	X	X					X	X		X			X		X
MAKE PAPER	X						X	X		X					
GRAPHICS INTRODUCTION	X		X			X		X		X					
GRAPHICS CHART	X														
USE COMMON WORDS	X		X			X				X					
GRAPHICS MATERIALS	X							X	X	X				X	
GRAPHICS INDUSTRY	X	X	X				X	X	X	X			X		
DESIGN													X		

* X represents where the activities meet objectives or aid in the understanding of concepts.

The levels of performance expected of the students, by the standards committee are:

ACTIVITY	LEVEL OF PERFORMANCE
1. SIGN PRESS	I
2. RUBBER STAMP	III
3. DRAFTING	III
4 & 5. USE OF CAMERA	IV
6. CONTACT PRINTING	I
7. ENLARGING	III
8. OCCUPATIONS	II
9. MAKE PAPER	II
10. INTRODUCTION	I
11. GRAPHICS CHART	I
12. COMMON WORDS	I
13. GRAPHIC MATERIALS	IV
14. DESIGN	IV

JUDGMENTS

- Incongruence exists between the teacher's intents and observations because he expected students of normal or better intelligence. Boys B, C & D were in fact, below normal.
- Boy A scored highest on the pretest. This could be a result of his higher IQ or of his previous experience in the Photo club. There is the possibil that boy A had completed all the intents of the instruction before he start the area.
- Question as to validity of pretest because it did not discriminate. Felt was raised that performance in Industrial Arts is not necessarily positive related to IQ ratings.
- The point was raised that boy A should do excellently in I.A. Because he scored high on the non-verbal test, he should therefore do well in manipul activities.
- The standards are not realistic for grade 8 students. The observed IQ is low for an average grade 8 class but it was felt that the sample might not have been representative of the ability of the whole class.

Sign Press

- Boy E did not perform as intended.
- Does working in groups allow each student to reach standard? It was felt that, in this case, all boys, except boy E did complete the intended activ
- The main purpose of the sign press activity is to show the relationship between this equipment and the offset press. The level I performance for this activity which is stated in the intents and standards column is too low. At least level III performance is required to teach the concept.
- This is an activity which may be performed without teacher demonstration.

Rubber Stamp

- There is incongruence with intents in that boys B, C and D did not complet this activity.
- This activity could be used for enrichment if the relationship between the rubber stamp and the offset press was shown.
- Level of performance I, means that no concept would be taught. This shows inconsistency between, intents, observations and standards.
- The judgment committee felt that at least level III performance should be expected in this activity.
- This is an activity which could be performed at a high level without teach demonstration.

Drafting

- Teachers intent is not in congruence with the standards. It is felt that activity should emphasize sketching and drawing interpretation.
- The standards as set are realistic and desirable in view of the curriculum guide.
- Lack of student participation in this activity is viewed as detrimental si the curriculum guide places such a heavy emphasis upon the activity.
- Students should have been compelled to complete this activity. Perhaps the teacher's tendency to allow freedom of student behaviour is not congruent with the intent of the curriculum planners or with the expectations of the standards committee.
- Student freedom is not advisable at junior high school level. It is felt that this approach would better suit a senior high school program.

Activity 4, 5, 6, & 7

- Students should view a demonstration of the operation of equipment. This would reduce the time wasted by the students.
- Dominance of boy A was noted. This was desirable in that he performed demonstrations for other students. Since he carried out his operations well, it was felt that teacher may have been perceptive in allowing his dominance.
- The feeling that what was observed is perhaps not what was intended exits. The other boys did more observation than participation.
- For these activities the standards are clear but level of performance expected is too high.
- The practice of requiring that each student contact print an adequate negative is desirable. Students should also receive the opportunity to process their own negatives.
- Students did not have experience on all machines or in all processes. This seems to indicate a lack of structure.
- Discussion is necessary to help in the understanding of concepts. The students should have been assembled and allowed to discuss their ideas. Perhaps they may have then gained more understanding.

The operations not included as intents by the instructor should have been included to some extent. It was felt that the standards committee was expecting too high a performance level from the students at this grade level.

Occupational opportunities
Instruction in this field is necessary. The real question involves the method of presentation to the group. Perhaps use of a wall chart would suffice. Having students actually participate in the activity may be all that is necessary to convey the desired understanding of the division of labor.

Paper making
- This is a desirable activity. Students would derive enjoyment from participation in this activity.

Graphics material
- This is enrichment intended for only one or two students. Have one student complete the activity, perhaps at home. He should then explain what he has done to the other students. There is insufficient time in class for activities such as this.

Microfilm
- Is an activity which should be included with visual communications.

Definition of V.C. - anything to do with the photography process.

Definition of G.C. - anything to do with the printing process.

- The judgments committee felt that the teacher and the persons on the standards committee failed to understand the difference between V.C. and G.C.
- The placement of activities in both V.C. and G.C. is evidence of misinterpretation of the curriculum guide.
- The judgment committee noted that the division into two units is one of administrative necessity rather than of content division. This mixing of activities may be favorable.
- The mixing could also be caused by the fact that the objectives of the curriculum are not stated in behavioral terms.
- Repetition of activities is not desirable because of the time factor. It is felt that repetition is wasting much of the students' time.

Congruence does exist between antecedents, transactions and outcomes. However, the outcomes leave a lot to be desired. The differences between intents and standards at the "outcomes" level is too great, the "observed" level of performance is too different from both.

Post-test

The results showed that the students learned very little. This may be interpreted in the following way.
- question the validity of the test.
- the test was perhaps content-oriented rather than concept-oriented.
- the test is valid, but at too high a level for the students being tested.
- perhaps an understanding of the concepts is beyond the students in this grade level with this experience in the area.
- the gap between machine operation and concept understanding is not being bridged.
- the students did not perform the activities at a level high enough (level III or more) for an understanding of the concepts to occur.
- to understand the concepts is expecting too much of most junior high school students.

Implications

- The level of performance stated may not be sufficient to ensure understanding of the concepts. However, if the curriculum is designed correctly, the activities in future years will require a higher level of performance. Perhaps after grade 12 the concepts will finally be understood by the students.
- There is an indication that boy E may have learned without actually doing the activities, since he did show a growth on his post-test.
- Boy A's lack of growth could be attributed to the fact that the program did not challenge his mind. Perhaps, however, the understanding of the concepts was beyond his capabilities.
- Judgment committee felt that the objectives were not achieved and that they are not realistic because they are too vague. Need to write objectives in behavioral terms so that the activity can be linked with the objective. There is a need to design the activities to meet the objectives. Presently it is difficult to evaluate any single activity on the basis of the course objectives.
- It was the feeling of the committee that the standards are reasonably adequate. There was a dispute over the accuracy of the levels of performance expected for each activity by the standards committee.
- In some cases the intents of the instructor were not in congruence with the expectation of the curriculum planners or with the standards committee.

CHART 2

GRAPHIC COMMUNICATIONS MATRIX

INTENTS

The ability of the students as scored on an IQ test will be normal or above.

All students will have scored a minimum of C or better on their previous school year's work.

All grade 9 students will have had Industrial Arts experience in grade 8. These students will have completed the visual communications program offered in grade 8. They will be familiar with type and its use, with cameras and their use, with the enlarger and its use. The students will also have an understanding of the concepts taught in the grade 8 visual communications program.

The students will be in the 13 to 15 year age group.

1. Operate the Offset Press
   a. run pre made master.
   b. design and run direct image master.
   c. ink, run, clean the press.

2. Make a Letter Head
   a. make line copy using the available equipment.
   b. photographically produce a negative of the line copy.
   c. transfer the image from the negative to an offset master.

3. Produce a High Quality Year Book Page
   a. take 35 mm photos of a friend working in the Industrial Arts Laboratory.
   b. process the film and make enlargements of the best photos.
   c. make a half tone negative of a print suitable for reproduction.
   d. make a paste up of a page including some line copy, photos and color separation.
   e. produce an offset master of the paste up.
   f. run 100 good copies of the page and store for later binding.

4. Produce a Micro-film

5. Produce a Printed Circuit
   a. use photographic methods.

6. Do an Ortho-graphic Drawing
   a. use the available instruments
   b. make a print of the drawing on the blue ray copier.

It was expected that the students would be able to:
   a. operate the offset press.
   b. employ different ways of producing offset masters.
   c. use the 35 mm camera.
   d. use the press camera.
   e. process film and paper in the darkroom.
   f. use the enlarger effectively.
   g. know when half tone screen is needed.
   h. know how to produce a printed circuit.
   i. have produced an orthographic drawing.
   j. know how to produce a micro film.

Expected outcomes in terms of the course objectives or concepts:

ACTIVITY	OBJECTIVES 1	2	3	CONCEPTS BY TOPICS A	B	C	D	E
1		X					X	
2		X					X	
3		X					X	
4		X					X	
5		X					X	
6		X					X	

* X represents where the activities meet objectives or aid to the understanding of concepts.

The levels of performance expected of the students in the graphic communications activities are:

ACTIVITY	LEVEL OF PERFORMANCE
1	I
2	II
3	IV
4	I
5	I
6	III

Levels of Performance   Bradfeld and Moredock 1957, p. 204.

Level I : imitating, duplicating, repeating.

Level II : recognizing, identifying, remembering, recalling, classifying.

Level III : comparing, relating, discriminating, reformulating, illustrating.

Level IV : explaining, justifying, predicting, estimating, interpreting, making critical judgments, drawing inferences.

Level V : creating, discovering, reorganizing, formulating new hypothesis, formulating new questions and problems.

Graphic Communications Objectives

1. To develop in the student an appreciation of the importance of graphics in all aspects of a productive society.
2. To develop an appreciation for the many applications of light sensitive materials in a productive society.
3. To develop an understanding of the relationships and the interdependency of the various divisions of labor in the areas of graphic design, process photography, plate making, reproduction and bindery.

OBSERVATIONS

The ability of the grade 9 students as shown by an Otis IQ test score is as follows:

Boy A - 129
B - 119
C - 90
D - 115
E - 128
F - 115

The marks received by these students in their previous school year were not available. To pass from grade 8 to grade 9 requires an average mark of C. All boys in the study had been in grade 8 the previous year.

All boys in the study had been involved in the grade 8 visual communications program during the previous year. The boys were familiar with the equipment in the graphics area. None of the boys were sure of the procedures used in operating most of the equipment, but were knowledgeable of the location of the instructional booklets. On the pretest the boys made the following scores:

Boy A - 15 of 31
B - 12 of 31
C - 15 of 31
D - 12 of 31
E - 13 of 31
F - 11 of 31

The ages of the boys in the study were:

Boy A - 14
B - 14
C - 15
D - 14
E - 14
F - 14

Operate the Offset Press

Boy A made a paste up using magazine pictures and letters. Working with other boys he produced a metal master of the paste-up using the BM39 offset plate maker. Copies of the master were run off by the boys. Boy A demonstrated that he knew the operating procedure for the offset press and the BM39 offset plate maker. Boy A also cleaned and preserved his masters. Three class periods were spent by boy A participating in the above mentioned activity.

Boy B completed the activity working with boy A. He demonstrated that he was able to operate the offset press and that he was able to operate the BM39 offset plate maker and to prepare and preserve offset masters. Boy B spent three and one half class periods participating in the above mentioned activity.

Boy C observed boys A and B during most of the above mentioned activities, he participated, in a minor fashion, in the plate making and press operation, but he was always working under direction of one of the other boys. Boy C spent two class periods participating in this activity.

Boy D worked with the other boys for one and one half class periods, during which time he assisted in the making of metal masters, and the preparation and operation of the offset press. Boy D was an observer for most of the time spent on this activity and therefore did not demonstrate his understanding of the operations.

Boy E watched boys A, B, C, operate the BM39 offset plate maker and run the master on the offset press for one half of one class period.

Boy F did not participate in the offset master preparation of the offset press operation.

Rubber Stamp Making Activity

Boy A produced a rubber stamp. This activity took him two class periods to complete.

Boy B produced a rubber stamp. This activity took him one class period.

Boy C produced a stamp on two different occasions. On his first stamp he had help from a friend. Both stamps were usable. This activity took two class periods.

Boy F made a matrix for a stamp but did not complete the activity.

Use of the Camera

Boy A operated the press camera. He loaded two sheets of film and exposed both.

Boy D operated the press camera. He loaded two sheets of film and exposed both.

Film Processing

Boy A developed the film which he had exposed in the press camera. His negatives turned out well.

Boy D developed the film which he had exposed in the press camera. His negatives turned out well.

Enlarging

Boy A worked in the darkroom operating the enlarger. He made test strips, and after much experimentation, he produced a fair enlargement. Boy A did not work by himself but during two class periods he performed all aspects of the operation.

Boy D worked in the darkroom with boy A for two class periods operating the enlarger. During this time boy D took part in all aspects of the operation.

Boy F worked in the darkroom with boys A and B for one class period. Boy F did not take an overly active part in this operation.

Spirt Duplication

Boy B helped other boys use the spirt duplicator.

Boy C helped other boys prepare ditto masters.

Boy D made masters and ran them off on the spirt duplicator with the help of others.

Boy E helped other boys prepare ditto masters. He helped run off copies on the spirt duplicator.

Photo Copier

Boy F worked on the photo copier for one class period, it took him a long time to get good copies. This boy demonstrated the use of the copier to a boy from another area during another class period.

Sign Press

Boy B selected type and made a sign on the sign press, this operation only took part of one class period.

Boy C worked with boy B and selected type for a sign. He never did make the sign.

Boy E worked on the sign press, he spent half of one class period making a sign.

Boy F worked on the sign press, he spent one class period working with a friend from another area to make signs.

PRE-TEST POST-TEST RESULTS

		CONCEPT 1			CONCEPT 2							CONCEPT 3						CONCEPT 4			CONCEPT 5					CONCEPT 6			CONCEPT 7				TOTAL OUT OF
		1	2	3	4	6	8	9	10	26	11	12	13	14	15	16	17	18	19	20	5	21	23	24	25	7	22	27	28	29	30	31	31
9	PRE-TEST	1	1	0	1	1	0	0	0	0	1	0	1	1	0	1	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	0	15
A	POST-TEST	0	1	0	1	1	0	1	0	0	0	0	1	1	0	1	0	1	1	1	1	1	0	1	0	1	1	1	0	0	0	0	16
9	PRE-TEST	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0	1	0	0	0	0	1	1	0	1	1	0	0	1	0	12
B	POST-TEST	1	0	1	1	0	0	0	0	0	1	1	1	1	1	0	0	0	1	0	0	0	1	1	1	1	1	1	1	0	1	0	17
9	PRE-TEST	1	1	1	0	1	1	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1	0	1	0	1	0	0	0	1	0	0	15
C	POST-TEST	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	1	0	0	1	1	0	1	0	0	0	10
9	PRE-TEST	1	0	0	0	1	0	0	0	1	1	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	1	0	0	12
D	POST-TEST	1	1	0	0	1	1	1	0	0	1	1	1	1	1	0	0	1	1	0	0	0	1	1	1	1	1	0	1	0	0	0	18
9	PRE-TEST	0	0	0	1	1	1	0	0	1	1	0	0	1	1	0	1	1	1	0	1	0	1	0	0	0	1	0	0	0	0	0	13
E	POST-TEST	0	0	1	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	1	1	1	0	0	1	1	1	0	0	0	0	11
9	PRE-TEST	1	1	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0	0	0	0	1	1	0	0	0	0	0	11
F	POST-TEST	0	1	1	1	1	0	0	0	0	0	0	1	0	1	0	0	1	1	0	1	0	1	1	0	0	1	0	0	0	0	0	12

* 1 indicates a correct response to the test question
0 indicates an incorrect response to the test question

Concept 1,	VC. topic C	Production depends upon man's ability to express his ideas in the form of drawings and symbols.
Concept 2,	GC. topic C	The total system of photo-offset lithography is dependent on the interrelationship of diversified divisions of work.
Concept 3,	VC. topic A GC. topic E	All graphic representation is either by continuous tone or dicotomous process.
Concept 4,	VC. topic D GC. topic E	A productive society must prepare its youth to make realistic vocational choices.
Concept 5,	VC. topic B	Light sensitive materials provide the means by which the reproduction of printed and pictorial materials can be efficiently performed.
Concept 6,	GC. topic D	Exploring varied characteristics of light sensitive material increases the versatility of the offset process.
Concept 7,	GC. topic B	The fact that oil and water do not mix is the basic principle used in offset lithography.

The students in graphic communications performed the following activities at the levels of performance indicated on the chart below.

ACTIVITY	Boy A	Boy B	Boy C	Boy D	Boy E	Boy F
Operate the Offset Press	IV	III	I	II	II	
Rubber Stamp	I	I	I			I
Use of the Camera	IV			IV		
Film Processing	I			I		
Enlarging	IV			IV		I
Spirt Duplication		I	I	I	I	
Photo Copier						IV
Sign Press		I	I		I	I

STANDARDS

The students in graphic communications will be boys or girls in grade 9.

The ability of the students will vary from very high to very low. It is expected that very low ability students would not be encountered in most Industrial Arts laboratories.

Students taking graphic communications are expected to have completed the work in the visual communications program. It is expected that the use and operation of such equipment as: sign presses, drafting equipment, blue ray machine, the camera and enlarger will be known by the students. The students will understand the concepts listed in the curriculum guide under visual communications after their grade 8 experiences in this area.

Offset Familiarization

Run a pre-made master using SPI on the offset press. Clean the press after use.

Direct Image Master

The student will layout a design for a project.
The student will prepare a simple direct image master using one media, e.g. sign press or leroy.
The student will run copies of his master and clean the offset press after use.

Photo Offset Simulation

The student will make a rough sketch of a layout based on translucent originals.

The student will prepare good copy using translucent originals.

The process camera will be simulated by using diazit reversing film and translucent originals. Strip the diazit film in a masking sheet and burn it into a printing plate.

The student will run copies on the offset press, clean the press.

The student should have the similarities between the diazit process and the photo- offset process explained to him.

Make a Letter Head

Using the available equipment the student should print his name and address.

Using a graflex camera and kodalith ortho type 3 film the student should shoot a letter head, then develop the film.

The negative should be stripped to a masking sheet.

The image is to be transferred from the negative to an offset master plate using the diazit process.

Better students should be allowed to incorporate a second color, in straight line, to improve the design of the letter head.

The student should be made aware of the processes involved.

Photo Offset Work

Too involved for the equipment available in the junior high school industrial arts.

The student may use the press camera to make a half tone negative.

The negative can be masked and stripped to a sheet of golden rod.

Exposure and development of a master plate can be done.

Students would be able to demonstrate an understanding of the process involved and explain why the quality is not as good as it might be.

Micro-film

The student should prepare or find a suitable drawing.

He should produce a micro-film using a 35 mm camera.

A print out using the enlarger may be done.

The student should be made aware of why micro-filming is important.

Printed Circuit

The student should layout the actual electrical components of a desired project.

A drawing should be prepared of the electrical circuit.

A negative of the drawing should be made.

The plate should be etched.

The project should be completed; wire, soldered, and test.

Drafting

Given isometric or oblique drawings of an object the student will visualize and make a multi-view sketch of the object.

Given multi-view drawings the student will make oblique, isometric and perspective sketches of the object.
The student will make one multi-view drawing of an object using a drafting machine, templates and scales. A blue line print will be made of the drawing using the diazo process.

Use of the Camera

The student will read or take part in an audio-visual presentation on each of the following topics: the camera, the depth of field, the light meter, flash and flood lights, films, print paper, processing techniques.

The student will take several pictures with a camera under conditions controlled by the teacher. Lights, background, etc. should be teacher set up initially. A good first product is essential.

The student will develop his film following instructions set out by the teacher.

Enlarging

The student will follow the provided instructions and operate the enlarger.

The student will enlarge the negatives that he produced in the previous activities.

The student will use only polycontrast paper for this activity.

Test strips will be used by the student to find the correct exposure and filter to use.

The prints will be processed by following the instructions set out by the teacher.

Spirt Duplication

This is to be used as an extra project.

The student will lay out out and make a stencil, then run off copies.

The student should be made aware of the advantages and disadvantages of the process.

Occupational Opportunities

By reading related information or taking a field trip the student should be able to
- list the divisions of labor.
- list the salaries, education required, training, employment opportunities for the graphics industry.

Graphics Introduction

The student should participate in a presentation outlining the area of graphics. This presentation may be in the form of related readings, tape and slide presentations, movies, or video tapes.

Graphics Chart

A chronological chart showing the significant development of printing starting with Gutenberg. This should be a classroom display supplemented with contributions from the students.

Use of Common Words

The students should be encouraged to use technical vocabulary in all his lab work.

Graphics Material

Students should be encouraged to research the production and use of various materials in graphic reproduction.

Students should make a report or slide, tape presentation to be added to the resource center in the graphics area.

Graphics Industry

A class presentation should be made in the form of a movie or video tape that includes information on the processes and operations in the graphics industry.

Design

The basic principles of design should be outlined for the student.

The student should use the principles of design in a criticism of pre-made posters and pictures.

	VISUAL COMMUNICATIONS OBJECTIVES			TOPICS				GRAPHIC COMMUNICATIONS OBJECTIVES			TOPICS				
ACTIVITY	1	2	3	A	B	C	D	1	2	3	A	B	C	D	E
RUBBER STAMP MAKING	X									X			X		
SIGN PRESS	X		X					X		X					
USE OF CAMERA	X	X			X			X	X			X	X		
CONTACT PRINTING	X	X			X			X	X					X	
ENLARGING	X	X			X			X	X				X		
MICROFILM	X	X			X			X	X						
PRINTED CIRCUIT	X	X	X		X			X	X	X			X		
MULTIVIEW SKETCHES	X		X			X		X		X					
DRAFTING PLATE	X		X		X	X		X							
SKETCHING	X		X			X		X		X					
SPIRT DUPLICATION	X							X							
OFFSET FAMILIARIZATION				X				X		X		X	X		
DIRECT IMAGE MASTER	X			X				X		X		X	X		
LETTER HEAD	X	X		X	X		X	X	X	X		X	X		
PHOTO OFFSET SIMULATION	X	X		X	X		X	X	X	X		X	X		
PHOTO OFFSET WORK	X	X	X	X	X			X	X	X	X	X	X	X	
OCCUPATIONS	X	X					X	X		X			X		X
MAKE PAPER	X						X	X		X					
GRAPHICS INTRODUCTION	X		X			X		X		X					
GRAPHICS CHART	X														
USE COMMON WORDS	X		X			X				X					
GRAPHICS MATERIALS	X							X	X	X				X	
GRAPHICS INDUSTRY	X	X					X	X	X	X			X		
DESIGN			X										X		

* X represents where the activities meet objectives or aid in the understanding of concepts.

The levels of performance expected of the students, by the standards committee are:

ACTIVITY	LEVEL OF PERFORMANCE
OFFSET FAMILIARIZATION	I
DIRECT IMAGE MASTER	IV
PHOTO OFFSET SIMULATION	III
MAKE A LETTER HEAD	II
PHOTO OFFSET WORK	IV
MICROFILM	II
PRINTED CIRCUIT	V
DRAFTING	IV
USE OF THE CAMERA	IV
ENLARGING	III
SPIRT DUPLICATION	II
OCCUPATIONAL OPPORTUNITIES	II
GRAPHICS INTRODUCTION	I
GRAPHICS CHART	I
USE COMMON WORDS	I
GRAPHICS MATERIALS	IV
GRAPHICS INDUSTRY	II
DESIGN	IV

JUDGMENT

- There exists an incongruence between the intended
  and the observed antecedents. The observations s
  the G.C. program at a performance level far below
  incongruence suggests that the standards set for
  are excessively too high.
- The committee questioned whether such high standa
  These students already possess an awareness which
  need arises.
- Low IQ exhibited by boy C was not foreseen by the
  due to the instructor's unfamiliarity with the IQ
  which he may personally feel are of little importa
- Pre-test and post-test scores show the same inadeq
  on the visual communications chart.
- The standards are realistic for high average and a

Offset Press

- Observations show incongruence with intents and st
  merely observe the operation of the offset press.
  felt that this was undesirable. Students should h
  situation where each one performed the activity to

Photo Offset Work

- Waste of time and effort is experienced by student
  in grade 8, and who must then re-learn, use of the
  processing, etc., in order to perform an activity
  an application of photographic principles.
- If V.C. and G.C. were taught as two simultaneous u
  students would first learn camera operation, then,
  would see the relationship of the camera to the pr
  then the concepts would be understood.
- If the concepts are to be understood, it was felt
  instruction should be increased, or that the two u
  simultaneously, within the same year.
- The activities as set out in the intents by the te
  the use of an offset plate maker. It was felt thi
  machine was not automated and the basic process co
  suggested that use of such equipment would be cont
  should not be recommended for all schools.

Microfilm

- The standard is acceptable but this activity belong

The printed circuit activity is enrichment. The standa
time from electronics is utilized in the construction o

Drafting should not be included in G.C.

Spirit Duplication - enrichment only, if offered at all.

Rubber Stamp - is of no value at this level.

Sign Press - is of little, if any, value at this level.

Photocopier - is of no advantage.

The above four activities are enrichment only. They
methods of reproduction, but the cost involved does not

The standards are incongruent with the intent of the tea
as the one observed, where the students have a high degr
standards can not easily be met. Basically the standards
this particular teaching structure. The levels of perfor
of the standards.

There is inconsistency between the intended outcomes, in b
the actual achievement of objectives and concepts. It was
could have taught an understanding of the concepts and obje
desired.

The expected level of performance in activities associated
than that expected in V.C. This is consistent with the spi
but it was felt that the stated levels are excessively high
most students in junior high school.

Observations show that students were not led to an understa
This positively affected the post-test score. If students
their own thing", and are permitted to omit parts of the pl
possible that the concepts may be unlearned.

Both pre-test and post-test did not discriminate. Achievem
to interest rather than to intelligence. This implies that
upon student interest if he is to be successful.

The intents of the teacher are too vague. A standard of pe
established for students' guidance (behavioral objectives a
a need for direction of boy C's activity. The instructor sh
this boy to spend so much time outside of the area. Test re
boy had little understanding of what he was doing.

The objectives were not achieved. These objectives are unre
could be sub-divided into behavioral terms to make them more

The teacher's intents for G.C. were not achieved. This is d
fact that the students' achievement was below the standard
of the study. The committee emphasized that class organizat
sound both student-wise and instructional-wise. The student
right to visit or to do other things until he has completed
or activities in his area to a satisfactory level. This can
hold true for the senior high schools.

There is doubt concerning the teacher's understanding of the
The late issue of the curriculum guide may have caused lack
There is a feeling on the part of the judges that the class
rather than concept-oriented.

The suggestion was made that a guide written in behavioral t
this problem of instruction being product-oriented rather th

The standards committee placement of activities in both V.C.
indication as to the variety of different programs which may
of influence of the curriculum guide. The general feeling wa
was desirable provided that certain concepts are being taught

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